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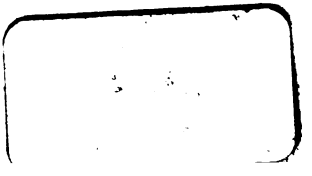

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TWENTY-FOURTH AND FINAL REPORT

OF THE

BOSTON TRANSIT COMMISSION,

FOR THE YEAR ENDING

FROM

THE BOSTON TRANSIT COMMISSION,

15 Beacon Street.

GEORGE F. SWAIN, *Chairman.*

HORACE G. ALLEN,
JOSIAH QUINCY,
JAMES B. NOYES,
DAVID A. ELLIS,
Commissioners.

EDMUND S. DAVIS,
Chief Engineer.

B. LEIGHTON BEAL,
Secretary.

CITY OF BOSTON
PRINTING DEPARTMENT
1918

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Eng. 865.1 (24th)

The Lemon Tree

52:145
15

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BOSTON TRANSIT COMMISSION.

15 Beacon Street, Boston, June 30, 1918.

To the City Council of the City of Boston:

In compliance with Statutes of 1894, chapter 548, section 24, the report of the Boston Transit Commission for the year ending June 30, 1918, is respectfully submitted. This is also the final report of the Commission.

Dorchester Tunnel.

The Dorchester tunnel was opened for use by the Boston Elevated Railway Company to Broadway station on December 15, 1917, and on June 29, 1918, to its terminal at Andrew station. Details of the work of construction will be found in the report of the Chief Engineer.

Real Estate.

Settlements for land taken in connection with the work of the Commission have been made on the line of the Dorchester tunnel as follows:

68–72 Dorchester avenue	Bernard J. & John Devine.
121–123 Dorchester avenue	Jackson–Peabody Estate.
539 Dorchester avenue	Ellen L. Prendeville.
551–557 Dorchester avenue	Mary A. & Nora J. Diggin.
559 Dorchester avenue	Mary A. Diggin.
575–581 Dorchester avenue	Kammerer–Gore Estate.
North side Dorchester avenue, near Woodward street	South Bay Company.
N. W. side A street	Mary E. White.
Cor. West Sixth & C streets	Richard H. Scott, tr.
507–511 Southampton street	James V. Devine Dev.
7–9 Boston street	Ruth Madden.
11 Boston street	Timothy Madden.
Ellery street	Boston Elevated Ry. Co.

Miscellaneous.

The work of the Commission was much delayed by conditions due to the war, in connection with which the following letter to his Honor, the Mayor, is self-explanatory.

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BOSTON TRANSIT COMMISSION,
15 BEACON STREET, BOSTON, May 7th, 1918.

[COPY]

HON. ANDREW J. PETERS,
Mayor, City of Boston:

MY DEAR SIR:— I beg leave to acknowledge receipt of your letter of the 6th inst. referring to a communication which you have received from the Chairman of the District Committee of the Dorchester Board of Trade "requesting a conference to determine the cause of delay in opening the Andrew Square section of the new South Boston tunnel." You ask the Commission to inform you when, in its opinion, "the tunnel will be completed and what has occasioned the delay." In response to your request I beg leave to give you the following information:

When the work in South Boston was begun, before the war, the Commission anticipated that it would be completed and opened to Andrew square long before the present time. That this has not been possible has been due primarily to the war. It is unnecessary to remind you of the serious interference which all works of this character have sustained on account of the war; owing largely to the serious change in labor conditions, the difficulty of securing men, and the high cost of labor and materials. All of the contractors of the Commission have been hampered by these circumstances and their work has been delayed in consequence, notwithstanding that the Commission has constantly used its utmost efforts to secure as speedy a completion of the work as practicable.

Last winter the Commission hoped and expected to be able to complete all of its own work early in the spring, but the unprecedented length and severity of the winter, added to the war conditions and the unusual depth of frost in the ground, caused still further delay. Nevertheless, the Commission planned to complete all of its underground work and the construction of the Andrew square station by April 1st, and on March 19th it addressed a letter to the Boston Elevated Railway Company stating this fact and informing that Company that at that time (March 19th) "the work on the tunnel at all points, including Andrew station, is in proper condition for uninterrupted equipment work by you, and that the Commission's work will be finished by April 1st." This referred to the underground work and to the work on the station, but not to the work of repaving Andrew square and the streets connecting with it. This work of repaving could not be begun to advantage, and should not have been begun, until the frost was out of the ground and the frost was much later this year than usual. Furthermore, in this work of repaving, the Street Department of the City of Boston desired to have certain methods used with reference to cutting and laying the blocks which were different from those which the Commission could properly employ as a part of the cost of the tunnel, and the Commissioner of Public Works agreed that the City should bear such additional cost as might be involved.

Bids were called for for this paving work, to be submitted March 28th, and at that time were publicly opened and read. At that time, however, the bill which your Honor urged before the Legislature, which would provide the City with additional funds for street paving, had not been

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passed by the Legislature and the Corporation Counsel advised this Commission that if the City was to bear any part of the expense the Commission could not properly proceed to award the contracts for paving until this bill had been passed and had received the approval of his Excellency, the Governor, and perhaps not until funds had been actually appropriated by the City Council, covering the expense to the City which this paving would involve.

As soon as the bill received the approval of the Governor, the Chairman of the Commission communicated with the Corporation Counsel and with him called upon your Honor to explain the matter. Your Honor authorized the Commission to proceed with the work without waiting for a definite appropriation by the City Council. The Commission thereupon immediately awarded the contracts to the lowest bidder, these contracts including the method of paving desired by the Street Department. The contracts were accepted and signed and the contractor is now proceeding in accordance with them. On account of the delay arising from the fact that the Commission was obliged to await the passage of the bill, it was necessary for the Commission to extend the time of completion at first fixed by an equivalent time. The contract for repaving Andrew square now provides that the work shall be completed June 19th. The Commission, however, included in its specifications the provisions that "in the order of doing his work the contractor shall give preference to the repaving of Dorchester avenue and Andrew square," in view of the fact that this paving and the relaying of the surface tracks must proceed together. It has since instructed its engineer to instruct the contractor to give preference to all work which would affect the use of the station by surface cars and it is informed by its engineer that, in his opinion, said work which affects the operation of surface cars can probably be completed by June 2nd.

The Commission has brought these facts to the attention of the Boston Elevated Railway Company and has urged upon that Company the desirability of pushing its own work of equipment and of surface track laying as rapidly as possible, with a view to opening the station as soon after June 2nd as practicable.

The Commission feels that it has done everything humanly possible to hasten the completion of the tunnel and its opening for traffic and that any delays which have deferred the date of opening have been due to the force of circumstances.

Very respectfully yours,
(Signed) GEO. F. SWAIN,
Chairman.

Contracts have been awarded for completing the repaving over Dorchester tunnel and the work is now well under way.

BOYLSTON STREET SUBWAY.

Arlington Street Station.

On August 28, 1917, the Public Service Commission, in accordance with chapter 344, Special Acts of the year 1917, passed an order requesting the Boston Elevated Railway Com-

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pany and the Boston Transit Commission in the name of the City of Boston to enter into a contract, on terms fixed in the order, for the use of the proposed station at or near Arlington street, but the Company did not accept the terms so fixed, and nothing was done.

Massachusetts Station.

In accordance with the terms of chapter 373 of the Special Acts of 1917 and chapter 376 of the Special Acts of 1915 the Commission, at the request of the Boston Elevated Railway Company, has entered upon the construction of a prepayment area at Massachusetts station. This work requires the building of a bridge over the tracks of the Boston & Albany Railroad, and on November 1, 1917, the Commission petitioned the Public Service Commission for a location for such bridge, and on November 26, 1917, the necessary permission was granted. The work is now well under way. Details of this work will be found in the report of the Chief Engineer.

EAST BOSTON TUNNEL EXTENSION.

Settlements for Takings.

In addition to the settlements already mentioned for land takings numerous claims for damages have been settled, as follows:

2–24 Green street, 12–15 Bowdoin street, 3–21 Cambridge street	Howard Stockton *et al.* trs.
94–100 Court street	J. C. Haines Estate.
102–8 Court street	W. P. Weeks *et als.* Trs.

EAST BOSTON TUNNEL.

As elsewhere stated, the East Boston tunnel was the first sub-aqueous tunnel for passenger transportation ever constructed entirely of concrete. Almost all sub-aqueous tunnels before or since have been constructed with a shell of cast-iron segments, bolted together, and inside of this shell a lining of concrete.

The character of the ground under the harbor was such as to make it appear to the Commission that it might be possible to construct the East Boston tunnel more economically entirely of concrete, and this plan was carried out, resulting in a saving to the city which may be estimated at between $600,000 and $1,000,000.

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Having no outside lining, however, this tunnel is exposed to the action of salt water along its outer surface, and it so happens that the ground water in the incline in East Boston has been discovered to contain, for some unknown cause, from two to six times the amount of sulphuric anhydride found in ordinary seawater.

The result of this has been that, while as a whole, the tunnel has been and still is, remarkably tight, leakage has developed at some places and it has been necessary to carry on repairs by grouting with a rich cement low in alumina in order to maintain it in good condition. The cost of this maintenance has been much less than the annual interest on the saving made by the adoption of this form of construction.

The Commission desires to emphasize the importance of continuing the close inspection of the tunnel and the method of maintenance heretofore carried on.

MISCELLANEOUS.

In addition to the settlements already mentioned, for land taken, numerous small claims for damages, etc., have been paid as follows.

ACCOUNT OF	Number of Claims.	Total.
Dorchester Tunnel	14	$9,531 19
Boylston Street Subway	4	1,509 51
East Boston Tunnel Extension	6	879 21

LEGISLATION.

The following acts have been passed by the Legislature during the current year:

Chapter 24, General Act "An Act Relative to the Transfer of Employees and Laborers in the Service of the Boston Transit Commission." . . . . . Appendix A

Chapter 185, Special Act "An Act to Provide for the Transfer of the Powers of the Boston Transit Commission to the City of Boston." . . . . . Appendix B

TERM OF THE COMMISSION.

Chapter 368 of the Special Acts of 1917 extended the term of the Commission to June 30, 1918, and on July 3, 1917, the

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Commission reorganized for the extended term by the choice of George F. Swain, Chairman, B. Leighton Beal, Secretary, and Edmund S. Davis, Chief Engineer.

HISTORY OF THE COMMISSION.

Chapter 185 of the Special Acts of 1918 provides that "upon the expiration of the term of office of the Boston Transit Commission the powers and duties of the commission shall be exercised and performed by the mayor, the commissioner of public works and city treasurer, or by such person or persons, not exceeding three, as may be appointed by the mayor", etc. The term of the Boston Transit Commission expiring by limitation on June 30th it would seem proper to outline briefly its activities during the past twenty-four years.

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During the period of the existence of the Commission, the following works have been built:

TUNNEL OR SUBWAY.	Date of Beginning.	Opened for Traffic.	LENGTHS.		Approximate Cost.
			Feet.	Miles.	
Tremont Street	March 28, 1895	September 3, 1898*	about 8,900	1.68	$4,369,000.00
East Boston	May 5, 1900	December 30, 1904	7,480	1.42	3,325,000.00
Washington Street	October 6, 1904	November 30, 1908	6,110	1.16	7,996,000.00
Cambridge Connection	September 29, 1909	March 23, 1912	2,486	.47	1,452,000.00
Boylston Street	March 12, 1912	October 3, 1914	7,937	1.50	4,943,000.00
East Boston Ext.	November 29, 1912	March 18, 1916	2,169‡	.41	2,287,000.00
Dorchester	May 30, 1912	June 29, 1918†	11,911	2.26	10,582,000.00
Charlestown Bridge	August 15, 1896	November 27, 1899	—	—	$1,570,000 00

* Tremont Street Subway opened to Park Street
via Boylston Street ..... September 1, 1897
via Pleasant Street ..... September 30, 1897
to the North Station ..... September 3, 1898
Park Street Station enlargement opened ..... March 8, 1915
† Dorchester Tunnel opened to Washington Station ..... April 4, 1915
South Station Under ..... December 3, 1916
Broadway Station ..... December 15, 1917
Andrew Station ..... June 29, 1918

‡ In addition a length of 364 feet of the East Boston Tunnel was changed, in grade and otherwise, as a part of the East Boston Tunnel Extension.
Total length of subways and tunnels is 8.9 miles.
Length of tracks in the subways and tunnels is about 19.27 miles.

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Statutes of 1893, chapter 478, provided for the creation of a Board of Subway Commissioners, with authority to construct a subway or subways from near the junction of Tremont and Pleasant streets to the vicinity of Scollay square. This Act having been accepted by the city council, on July 1, 1894, his Honor, the Mayor, Nathan Matthews, Jr., appointed as Subway Commissioners Messrs. Charles H. Dalton, Thomas J. Gargan and George F. Swain. On February 14, 1894, this commission made a report to the Legislature calling attention to defects in the act and recommending its amendment. The Legislature held numerous hearings and the recommendations of the commission were finally incorporated in a composite act (Statutes 1894, chapter 548), the first half providing for the incorporation of the Boston Elevated Railway Company and the latter half for the creation of the Boston Transit Commission. These two parts were not, however, intimately related to each other. The Act gave the commission greater powers than had been asked for by the Subway Commission. The three members of the Subway Commission were made part of the new commission with the provision for two additional to be appointed by the governor. His Excellency, Governor Frederick T. Greenhalge, thereupon named Messrs. George G. Crocker and Albert C. Burrage, who were confirmed by the Governor's Council. The Boston Transit Commission organized August 15, 1894, by the choice of George G. Crocker, Chairman. On August 30, 1894, Howard A. Carson, then chief engineer of the Metropolitan Sewerage Commission, was appointed chief engineer and served until June 30, 1909. On July 1, 1909, Edmund S. Davis was appointed acting chief engineer and on February 1, 1911, was appointed chief engineer. On October 1, 1894, B. Leighton Beal was appointed secretary. The Act authorized the commission at its discretion to build a subway or subways between a point within 1,000 feet of the junction of Tremont street and Shawmut avenue on the south to Causeway street on the north, with a branch to Park square or that vicinity, the tunnel under Beacon Hill and a tunnel from the vicinity of Scollay square to East Boston, and the laying out of a new way from a point near the junction of Shawmut avenue and Tremont street to Franklin Park. In addition the Act required the commission to construct a new bridge to Charlestown to take the place of the "Charles River Bridge." After careful study and numer-

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ous investigations the commission proceeded with the designing of what is now known as the Tremont street subway, and on March 28, 1895, ground was broken on the Public Garden.

At that time considerable doubt existed with regard not only to the necessity for subways but even as to their feasibility, and an effort was made by a certain group of citizens to enjoin the commission from proceeding with the construction of the subway. Their request for a preliminary injunction failed. They amended their petition and the matter was brought before the Supreme Court. Pending decision the work proceeded without delay and on June 15, 1896, the Supreme Court dismissed the bill (Prince *v.* Crocker, 166 Mass. 347). On June 19, 1896, the commission advertised that applications for the use of the subway would be received. Only three applications were filed, one from the West End Street Railway Company stating that its executive committee was authorized to take up the question of lease, terms, etc., one from George A. Lancaster and others stating their intention of organizing an elevated railway company, and one from the Lynn & Boston Railway Company asking to be considered "applicant for use in part" of the subway. Several conferences were held with the applicants. Negotiations were entered into with the West End Street Railway Company, and on December 7, 1896, a contract with that company for the use of the subway was executed, which on January 1, 1897, received the approval of the Board of Railroad Commissioners. The questions involved in this lease or contract were novel; the term only was fixed by the statute, leaving the questions of compensation, method of use, equipment, etc., to the commission and the leasing company. On this contract all the other contracts for the use of subways and tunnels have been based; but in the case of all later subways the rate of rental has been fixed by the legislature.

Mr. Burrage resigned from the Commission November 19, 1896, and Mr. Horace G. Allen was appointed in his place November 24, 1896.

The Tremont street subway was opened for use from its entrance in the Public Garden to Park street on September 1, 1897, and from the junction of Pleasant street and Shawmut avenue to its northern terminal on Causeway street on September 1, 1898. The Act of 1894 provided for the incorporation of the Boston Elevated Railway Company, which was

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to operate a single post system of elevated railways known as the "Meigs" system, the method of construction used in New York being specifically prohibited. It was found impossible to raise capital for the construction of this type of railway, and in 1897 (chapter 500), the Act was amended, permitting the construction of an elevated railway according to such plans or system as might be approved by the Board of Railroad Commissioners. Under this Act the present Boston Elevated Railway Company was organized. The new company was authorized to lease the West End Street Railway Company. The Act authorized the commission, on the request of the company, to construct a subway under Cambridge street between Bowdoin square and Court street to connect with the present subway, authorized the making of alterations in the Tremont street subway to adapt it for use by elevated trains, and required the commission, when the company took certain action to construct a tunnel to East Boston.

East Boston Tunnel.

On July 19, 1898, the Boston Elevated Railway Company having been authorized to begin the construction of its railway, the commission voted to proceed with the construction of the tunnel to East Boston. Later public hearings were held and a preference expressed for the "South Ferry" route. On November 29, 1898, a route from East Boston to Atlantic avenue in Boston was adopted, beginning in Maverick square, proceeding under Lewis street, reaching the Boston side at the South Ferry just in front of Eastern avenue, and running to Atlantic avenue, the cars then to come to the surface and proceed along Hanover street to Scollay square. On December 1, 1898, an application was filed with the Supreme Court for an injunction restraining the commission from proceeding, and, under advice of counsel, work was stopped pending the decision of the court, which on July 3, 1899, decided that the connection voted by the commission was not "a suitable connection" within the meaning of the law. (Browne *v.* Turner, 174 Mass. 150.) The court having decided that the tunnel must have "a physical connection" with the subway, new plans for a route under State street to Scollay square were adopted and active work was about to begin when on September 6, 1899, notice was received of a new application for injunction by the same association alleging the unconstitutionality of the Act.

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This delayed active work although studies and plans were continued. It was not until March 28, 1900, that a decision was reached, when the court dismissed the bill. (Browne *v.* Turner, 176 Mass. 9.) Actual construction of the tunnel began May 5, 1900, and on December 30, 1904, it was opened for public travel.

The East Boston tunnel is notable by reason of its size, its length under the harbor, the materials employed, and the manner of its construction. At the time the Tremont street subway was constructed, the price of steel and iron was very low. When the construction of the East Boston tunnel was begun these materials had risen greatly in price, which led to the consideration of concrete as a substitute. So far as known, this was the first concrete sub-aqueous passenger tunnel constructed anywhere.

Washington Street Tunnel.

In 1902 an Act was passed providing under certain conditions for the construction of a new tunnel and subway. The Act having been accepted by the people at the municipal election on December 11th of the same year the chief engineer was instructed to proceed with studies, etc. This Act provided for a tunnel for elevated trains and a subway for surface cars one of them to be under Washington street. The company deemed it inexpedient to construct both the tunnel and subway at the same time and urged the adoption of a route under Washington street for a tunnel for elevated cars and trains. The commission decided upon the May place-Devonshire street-Union street route, so called, passing under considerable private property, and the company appealed to the Board of Railroad Commissioners for a revision of this decision of the commission.

On November 29, 1903, the Board of Railroad Commissioners decided in favor of the Washington street route. The construction of this tunnel was begun on October 6, 1904, and it was opened for travel on November 30, 1908. The Tremont street subway was thereupon returned to its original use as a subway for surface cars. The cost per mile of track of the Washington street tunnel is probably the greatest of any tunnel ever constructed for traffic in a city.

The subway for surface cars was afterwards given up, and in place thereof the Legislature authorized the construction of

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the so-called Riverbank Subway, which was to run from Park street along the Charles River Basin to the junction of Beacon street and Commonwealth avenue. The Commission made surveys and plans for this subway, but it was afterward decided to replace it by a subway under Boylston street.

Mr. Dalton resigned from the commission October 11, 1906, and Hon. Josiah Quincy was appointed to fill the vacancy on the same date.

Mr. Gargan died July 31, 1908, and his place was filled by the appointment of Mr. James B. Noyes, July 20, 1909.

In connection with the Cambridge-Main street subway, by chapter 520, Acts of 1906, the Cambridge Connection, so called, from a new sub-station at Park street under Beacon Hill, was begun on September 29, 1909, and opened for public travel on March 23, 1912.

Under the Acts passed in 1911 three subways or tunnels were authorized, the Dorchester tunnel, the Boylston street subway, and the East Boston Tunnel extension. The Boylston street subway was in substitution for the so-called Riverbank Subway which had been previously authorized. Construction work on the Boylston street subway was begun February 6, 1912. By an Act passed in 1913 (chapter 810) in connection with the construction of this subway, the commission was authorized to construct a new incline in Boylston street between Arlington and Charles streets to take the place of the original entrance on the Public Garden. This Act permitted the commission to connect this subway with the present Tremont street subway near Park square and to suspend the construction of that part of the Boylston street subway between Boylston street and Park street, in order to hasten its opening for public use, and in order to permit of further study as to the best terminus for the Boylston street subway. The connection between the Boylston street subway and the Tremont street subway was made near Carver street and on October 3, 1914, it was opened to public travel.

The Act of 1897 which authorized the construction of the East Boston Tunnel called for a connection at grade with the Tremont street subway. Neither the commission nor the operating company considered this method of operation to be safe, and no permanent connection was ever made. The Act of 1911 required an extension of this tunnel under Court street and through Scollay square; and in making this extension the grade of the East Boston tunnel was lowered between Devon-

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shire street and Scollay square so that it could pass under the Scollay square station. The work on the extension was begun on November 27, 1912. On March 13, 1916, it was opened to Scollay Square Under and on March 18th all sections were in use.

Work on the Dorchester tunnel was begun May 30, 1912. It was opened to public travel to Washington station April 4, 1915, to South Station Under on December 3, 1916, to Broadway Station on December 15, 1917, and to Andrew Station on June 29, 1918.

Mr. Crocker died May 26, 1913, and Mr. David A. Ellis was appointed to the vacancy August 15, 1913.

In addition to constructing subways and tunnels the new bridge to Charlestown was constructed under direction of the Commission, William Jackson, the city engineer at that time, being appointed chief engineer for the bridge. The first plans were submitted for this bridge on October 9, 1894. The Commission believed that a drawless bridge at this point was desirable, but it found that State legislation, and also permission from the United States Government, was a necessary preliminary. After several months it was demonstrated that it would take two or three years to obtain the necessary permits for a drawless bridge. The Commission therefore abandoned that plan, deeming it unwise to delay the work without any assurance of ultimate success. This bridge was opened for public travel on November 27, 1899, with a revolving draw having two decks, the lower for highway traffic, the upper for elevated railway traffic. This is one of the widest and heaviest swing draws in existence.

In connection with its work the Commission has widened parts of Canal street, Cambridge street, Boylston street and Dorchester avenue, and also constructed the Travers street foot passage under the incline to the North Station.

On October 19, 1897, the Commission passed an order, which was required by the Act of 1894, that all street car tracks be removed from Tremont street between Boylston street and Scollay square, and from Boylston street between Tremont street and Park square. The West End Street Railway Company promptly complied with this order.

In addition to constructing the subways the Legislature has from time to time directed the Commission to make special investigations. In 1905 an inquiry was thus made into the subject of the further development of the subway system in

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the City of Boston, and a report was made to the Legislature of the following year. In 1907 an Act was passed directing the Commission to investigate the congestion and delay of teaming traffic, and the movement of freight in the City of Boston. The Commission reported on this matter on January 10, 1908, and most of the present street regulations are directly due to this report.

In 1909 the commission was ordered to sit with the Board of Railroad Commissioners, on the petition of the Boston & Eastern Electric Railroad Company for the right to construct a tunnel under Boston Harbor; and in addition a resolve of the same year directed the same Joint Board to investigate the advisability of authorizing this electric railroad to construct a tunnel or subways in the City of Boston. The same Joint Board was also directed to investigate the advisability of constructing additional subways, tunnels and elevated structures in the city as well as certain matters in connection with the finances of the West End Street Railway Company and the Boston Elevated Railway Company.

In the same year the Transit Commission was also joined with the members of the Railroad Commission, the Harbor and Land Commission, and the Metropolitan Park Commission as a Joint Board on Metropolitan Improvements.

In 1910 the Board of Railroad Commissioners was joined with the Transit Commission and directed, under four separate resolves, to make many investigations relating to transportation in the City of Boston, and also to consider whether it was advisable in the public interest to permit the Boston Elevated Railway Company to acquire stocks, bonds, property, or rights of other street railway companies, and to provide, in advance of the expiration of the existing contracts for the use of tunnels and subways in the City of Boston, for modifications of the relations between the Boston Elevated Railway Company and the West End Street Railway Company. Reports on all these matters were made to the Legislature as required.

In 1911 the same Joint Board was directed to investigate the question of construction of a teaming tunnel under Boston Harbor to East Boston, as to the proposed east and west tunnel in the City of Boston, and as to certain improvements in the subway and transportation system in the city. The Transit Commission was also directed to report an approximate estimate of the cost of removing the elevated structure in Charlestown and substituting therefor a subway.

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In 1912 the commission was directed to report a route for an extension of the Dorchester tunnel, and also to investigate the advisability and cost of constructing a tunnel between the cities of Boston and Chelsea.

In 1913 the commission was directed to investigate the advisability of a Washington street tunnel station at Bennet street, to estimate the cost and report the route for a tunnel between Boston and Chelsea, and to investigate the probable cost of removing the elevated structure from Dudley street to Sullivan square and the substitution of the necessary subways. It was also directed to investigate the advisability of constructing a subway to connect with the Dorchester tunnel at the South Terminal.

In the same year a Joint Board, consisting of the Railroad Commissioners and the Transit Commission, was directed to inquire into and consider the street railway service furnished by the Boston Elevated Railway Company and the Bay State Street Railway Company in the Metropolitan District.

In 1916 it was directed to investigate the construction of an extension of the Dorchester tunnel from Andrew square to Upham's Corner, and to investigate the necessity and advisability of providing an additional elevated railway station at or near the corner of Charles and Leverett streets.

The Transit Commission also sat as members of a Special Commission in 1916–17, comprising the Lieutenant-Governor, the President of the Senate, the Speaker of the House of Representatives, two members of the Senate, four members of the House, and the members of the Public Service Commission, to consider the financial condition of the Boston Elevated Railway Company and what changes, if any, were necessary in the laws relating thereto.

In 1918 the Transit Commission was directed to report as to a subway entrance at or near Park square.

The commission in due time reported on all of these matters.

The original Act provided that the term of the commission should expire on July 2, 1899. It was extended by various Acts as follows:

Acts of 1899, chapter 375. Extended to July 1, 1902.
Acts of 1902, chapter 534. Extended to July 1, 1906.
Acts of 1906, chapter 213. Extended to July 1, 1909.
Acts of 1909, chapter 355. Extended to July 1, 1911.
Acts of 1911, chapter 623. Extended to July 1, 1914.
Acts of 1914, chapter 644. Extended to July 1, 1917.
Special Acts of 1917, chapter 368. Extended to July 1, 1918.

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The following table shows the composition of the Commission from time to time:

	Appointed or Qualified.	Expiration of Term.
Charles H. Dalton *.....	August 15, 1894	Resigned October 11, 1906.†
Thomas J. Gargan *.....	August 15, 1894	Died July 31, 1908.
George F. Swain *.....	August 15, 1894	June 30, 1918.
George G. Crocker.....	August 15, 1894	Died May 26, 1913.
Albert C. Burrage.....	August 15, 1894	Resigned November 19, 1896.
Horace G. Allen.....	November 24, 1896	June 30, 1918.
Josiah Quincy.....	October 11, 1906	June 30, 1918.
James B. Noyes.....	July 20, 1909	June 30, 1918.
David A. Ellis.....	August 15, 1913	June 30, 1918.

* Appointed on Subway Commission on January 1, 1894.
† Died February 23, 1908.

Chairman, George G. Crocker, August 15, 1894, to May 26, 1913.
George F. Swain, June 2, 1913, to June 30, 1918.
Secretary, B. Leighton Beal, October 1, 1894, to June 30, 1918.
Chief Engineer, Howard A. Carson, September, 1894, to June 30, 1909.
* Edmund S. Davis, February 1, 1911, to June 30, 1918.

RECOGNITION OF EMPLOYEES.

At its final meeting the Commission passed the following votes:

Voted, that the Commission in holding its final regular meeting desires to place upon its record its appreciation of its indebtedness to its former chief engineer, Mr. Howard A. Carson. Mr. Carson began his work with the Commission in September, 1894, and continued it uninterruptedly until his resignation in June, 1909. He organized the engineering department and the methods of carrying on the work and set a standard not only for his successors here but for subway construction throughout the country. The Commission desires to bear testimony once more to its admiration for his professional skill and its appreciation of his high character and his devoted service to the Commission and the public.

Voted, that the Commission in holding its final regular meeting desires to place upon its records its appreciation of the devoted, skillful and efficient service which has been ren-

* Acting Chief Engineer, July 1, 1909, to February 1, 1911.

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dered by its chief engineer, Edmund S. Davis. Mr. Davis entered the service of the Commission as assistant engineer in September, 1894. Upon the resignation of Mr. Carson as chief engineer Mr. Davis was made acting chief engineer in July, 1909, and chief engineer in February, 1911. During his twenty-four years of service with the Commission he has exhibited a conscientious, self-sacrificing and rare devotion to duty and has performed all the duties entrusted to him with skill, economy and efficiency. The Commission cannot close its work without placing on record this testimony of its appreciation and of the pleasant relations which its members have had with Mr. Davis during their long term of common service.

Voted, that the Commission in holding its final regular meeting desires to place upon its records its appreciation of the devoted and efficient service of its secretary, B. Leighton Beal, who entered the service of the Commission October 1st, 1894, and has served continuously since that time. During this long period Mr. Beal has discharged with great efficiency the varied duties which have been entrusted to him and has been of much service to the Commission in its relations with employees, the public, and with everyone with whom he has had to deal. The Commission desires to bear this testimony upon its records to its appreciation of the efficiency and devotion which Mr. Beal has manifested in its service and to the pleasant relations which have always existed between him and its members during the long term of association.

Voted, that the Commission in holding its final regular meeting desires to place upon its records this testimony of its appreciation of the devoted and efficient service which has been rendered to the Commission by its employees in the engineering and clerical departments. They have manifested a devotion to duty, a willingness to forward all interests of the Commission, even if requiring self-sacrifice, and a skill and efficiency which have been a large factor in the success which has attended the works which the Commission has carried out, and for which success they deserve a due share of the credit.

SINKING FUNDS.

The following is the condition of the debt and of the sinking funds for the various divisions of the work of the Commission at the date of this report, as stated by the City Treasurer.

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SUBWAY (INCLUDING ALTERATIONS).

(*Debt* $4,416,000, *outside debt limit.*)

Amount of fund, July 1, 1917		$1,889,151 72
Interest on bank deposits, July 1, 1917, to date	$1,113 44	
Interest on investments, July 1, 1917, to date,	68,878 50	
Revenue, etc., July 1, 1917, to date	31,295 00	
		101,286 94
		$1,990,438 66

CHARLESTOWN BRIDGE, No. 1.

(*Debt*, $750,000, *inside debt limit.*)

Amount of fund, July 1, 1917		$283,237 85
Interest on bank deposits, July 1, 1917, to date	$1,591 28	
Interest on investments, July 1, 1917, to date,	8,460 00	
Requirement for debt	7,690 00	
		17,741 28
		$300,979 13

CHARLESTOWN BRIDGE, No. 2.

(*Debt*, $750,000, *outside debt limit.*)

Amount of fund, July 1, 1917		$316,789 81
Interest on bank deposits, July 1, 1917, to date	$2,503 79	
Interest on investments, July 1, 1917, to date,	8,484 19	
Revenue, etc., July 1, 1917, to date	2,093 34	
		13,081 32
		$329,871 13

EAST BOSTON TUNNEL.

(*Debt*, $3,283,000, *outside debt limit.*)

Amount of fund, July 1, 1917		$1,058,082 68
Interest on bank deposits, July 1, 1917, to date	$1,495 73	
Interest on investments, July 1, 1917, to date,	36,047 50	
Revenue, etc., July 1, 1917, to date	2,668 75	
Requirement for debt	21,765 00	
		61,976 98
		$1,120,059 66

BOSTON TUNNEL AND SUBWAY.

(Washington Street Tunnel.)

(*Debt*, $8,448,700, *outside debt limit.*)

Amount of fund, July 1, 1917		$1,541,686 77
Interest on bank deposits, July 1, 1917, to date	$1,045 97	
Interest on investments, July 1, 1917, to date,	57,901 41	
Revenue, etc., July 1, 1917, to date	56,540 45	
		115,487 83
		$1,657,174 60

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RAPID TRANSIT—CAMBRIDGE CONNECTION.

(*Debt*, $1,465,000, *outside debt limit.*)

Amount of fund, July 1, 1917		$110,099 77
Interest on bank deposits, July 1, 1917, to date	$677 92	
Interest on investments, July 1, 1917, to date,	3,430 00	
Revenue, etc., July 1, 1917, to date	14,484 62	
		18,592 54
		$128,692 31

BOYLSTON STREET SUBWAY

(Formerly Riverbank Subway.)

(*Debt*, $5,005,000, *outside debt limit.*)

Amount of fund, July 1, 1917		$6,700 06
Interests on bank deposits, July 1, 1917, to date	$182 24	
Interest on investments, July 1, 1917, to date,	35 00	
		217 24
		$6,917 30

DORCHESTER TUNNEL.

(*Debt*, $10,450,000, *outside debt limit.*)

EAST BOSTON TUNNEL EXTENSION.

(*Debt*, $2,450,000, *outside debt limit.*)

RENTALS PAID BY THE BOSTON ELEVATED RAILWAY COMPANY.

The following is a statement of the bills rendered for rental of the various tunnels and subways and the amounts paid thereon:

TREMONT STREET SUBWAY.

Sept. 30, 1917:			
Net cost of subway		$4,101,938 70	
Rental for two months to August 31, 1917, at 4⅛% per annum,	$33,328 25		
Rental for one month to September 30, 1917, at 4½% per annum	15,382 27		
One quarter's rental			$48,710 52
Alterations: net cost		242,673 93	
Rental for two months to August 31, 1917, at 4⅛% per annum,	$1,971 73		
Rental for one month to September 30, 1917, at 4½% per annum	910 03		
One quarter's rental			2,881 76
Dec. 31, 1917:			
Net cost of subway		4,101,938 70	
One quarter's rental			46,146 81
Alterations: net cost		242,673 93	
One quarter's rental			2,730 08
Carried forward			$100,469 17

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Brought forward		$100,469 17
Mar. 31, 1918:		
Net cost of subway	$4,101,938 70	
One quarter's rental		46,146 81
Alterations: net cost	242,673 93	
One quarter's rental		2,730 08
June 30, 1918:		
Net cost of subway	4,101,938 70	
One quarter's rental		46,146 81
Alterations: net cost	242,673 93	
One quarter's rental		2,730 08
Total		$198,222 95

WASHINGTON STREET TUNNEL.

Sept. 30, 1917:		
Net cost of tunnel	$7,925,179 61	
One quarter's rental		$89,158 27
Dec. 31, 1917:		
Net cost of tunnel	7,925,271 99	
One quarter's rental		89,159 31
March 31, 1918:		
Net cost of tunnels	7,925,271 99	
One quarter's rental		89,159 31
June 30, 1918:		
Net cost of tunnel	7,925,338 63	
One quarter's rental		89,160 06
Total		$356,636 95

CAMBRIDGE CONNECTION.

Sept. 30, 1917:		
Net cost of connection	$1,458,932 36	
One quarter's rental		$17,780 74
Dec. 31, 1917:		
Net cost of connection	1,458,932 36	
One quarter's rental		17,780 74
March 31, 1918:		
Net cost of connection	1,458,932 36	
One quarter's rental		17,780 74
June 30, 1918:		
Net cost of connection	1,458,967 92	
One quarter's rental		17,781 17
Total		$71,123 39

BOYLSTON STREET SUBWAY.

Sept. 30, 1917:		
Net cost of subway	$4,688,731 35	
One quarter's rental		$52,748 23
Dec. 31, 1917:		
Net cost of subway	4,701,906 60	
One quarter's rental		52,896 45
March 31, 1918:		
Net cost of subway	4,714,522 42	
One quarter's rental		53,038 38
June 30, 1918:		
Net cost of subway	4,758,656 63	
One quarter's rental		53,534 89
Total		$212,217 95

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EAST BOSTON TUNNEL EXTENSION.

Sept. 30, 1917:		
Net cost of extension	$2,208,426 29	
One quarter's rental		$24,844 80
Dec. 31, 1917:		
Net cost of extension	2,233,110 28	
One quarter's rental		25,144 99
March 31, 1918:		
Net cost of extension	2,237,210 28	
One quarter's rental		25,168 62
June 30, 1918:		
Net cost of extension	2,238,421 12	
One quarter's rental		25,182 24
Total		$100,340 65
Grand Total		$938,541 89

STATEMENT OF EXPENSES.

The following is a classified statement of the expenses of the Commission for the year ending June 30, 1918:

EAST BOSTON TUNNEL.

ENGINEERING DEPARTMENT.

Skilled Service		$273 18

SECTION B.

Construction	$1,000 69	
Field Supplies	95 96	
Labor	7,849 31	
Office supplies	49 37	
Skilled service	737 14	
Teaming	79 37	
		9,811 84

SECTION D.

Skilled Service		15 00

BOSTON TUNNEL AND SUBWAY.

Office Expenses:		
Printing		60 64

ENGINEERING DEPARTMENT.

Skilled service		84 98

SECTION FOUR.

Construction	$37 39	
Field supplies	4 95	
Labor	299 07	
Skilled service	62 00	
Summer Street Station	48 00	
Teaming	55 02	
		506 43

SECTION SEVEN.

Construction		24 00
Carried forward		$10,776 07

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Brought forward		$10,776 07

CAMBRIDGE CONNECTION.

ENGINEERING DEPARTMENT.

Skilled service		30 52

SECTION ONE.

Skilled service		5 04

DORCHESTER TUNNEL.

Office expenses:		
Furniture	$11 00	
Lighting	64 70	
Printing	1,011 90	
Rental	3,770 85	
Stationery—supplies	647 90	
Telephone—telegraph	1,369 24	
Messenger	1,346 22	
Office boy	40 00	
Stenographers	7,468 15	
Salaries of Commissioners and Secretary	29,333 33	
	$45,063 29	
Transferred to Boylston Street Subway account	5,847 60	
		39,215 69
Engineering and Miscellaneous Expenses:		
Chief Engineer	$7,875 00	
Clerks	3,938 32	
Field Supplies	1,294 71	
Fuel	418 05	
Instruments	51 70	
Labor	1,088 68	
Legal and expert advice	2,300 00	
Lighting	433 34	
Messengers	1,065 00	
Park Street Station enlargement	9 00	
Printing	1,790 24	
Rental	7,829 18	
Skilled service	40,260 72	
Stationery—supplies	1,547 09	
Stenographers	5,038 12	
Special Police:		
Labor	13,817 36	
Miscellaneous	180 44	
Teaming	27 50	
Telephone—telegraph	515 10	
Testing	43 81	
Tools	276 63	
	$89,799 99	
Credit:		
Stock	12,019 22	
		77,780 77

SECTION A.

(From the end of the Cambridge Connection at the east line of Tremont street, under Winter street to about the west line of Washington street.)

Construction	$45 83	
Field supplies	140 82	
Carried forward	$186 65	$127,808 09

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Brought forward	$186 65	$127,808 09
Labor	488 10	
Legal and expert advice	25 00	
Lighting	2 39	
Stationery—supplies	5 60	
		707 74
		$128,515 83

SECTION B.

(*From about the west line of Washington and Summer streets to a point about 50 feet east of the east line of Arch street.*)

Construction	$27 77	
Labor	30 62	
Legal and expert advice	456 52	
Stationery—supplies	2 80	
Teaming	3 50	
	$521 21	
Credit:		
Property damages: Takings	14,114 87	
		13,593 66
		$114,922 17

SECTION C.

(*Located in Summer street and extends from near Arch street to Dewey Square; about 1,018 feet long.*)

Henry S. Clark (Contract 631)	$814 88	
Paving	764 44	
Rental	8 00	
Skilled service	67 42	
Stationery—supplies	1 02	
Stenographers	418 35	
Telephone—telegraph	4 25	
Testing	10 00	
	$2,088 36	
Credit:		
Construction	298 35	
		1,790 01

SECTION D.

(*Located in Dewey square and Summer street; about 800 feet long. It includes a two-platform station with a lobby over the tracks, a pump well, elevator shafts and stairways.*)

Hugh Nawn Contracting Co. (Contract 621),	$785 98	
Henry S. Clark (Contract 631)	2,444 67	
Construction	4,391 57	
Field supplies	75 60	
Labor	510 00	
Paving	2,316 45	
Rental	24 00	
Skilled service	323 03	
Stationery—supplies	18 72	
Teaming	36 85	
Telephone—telegraph	12 75	
Tools	60	
		10,940 22
Carried forward		$127,652 40

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Brought forward		$127,652 40

SECTION E.

(*Under and near the Fort Point Channel, from a point in Summer street about 200 feet west of the Channel to about 80 feet north of the corner of West Second street and Dorchester avenue, South Boston; about 3,000 feet long.*)

P. McGovern & Co. (Contract 538)	$103,124 95	
Construction	521 85	
Field supplies	130 57	
Labor	4,524 99	
Legal and expert advice	65 00	
Lighting	329 97	
Paving	5 73	
Printing	66 06	
Property damages: Takings	350 00	
Skilled service	354 34	
Stationery—supplies	21 20	
Teaming	21 77	
Telephone—telegraph	20 19	
Tools	124 11	
Waterpipes	123 44	
		109,784 17

SECTION F.

(*Broadway station in Dorchester avenue, between Broadway and Dover street.*)

T. A. Gillespie Co. (Contract 599)	$74,805 21	
Otis Elevator Co. (Contract 619)	22,150 00	
John P. Berry (Contract 633)	2,695 42	
Crowley & Hickey (Contract 634)	15,891 00	
Galassi Mosaic & Tile Co. (Contract 638)	13,791 58	
Craffey & Keith (Contract 640)	8,953 19	
James A. Sullivan (Contract 642)	9,449 01	
E. Van Noorden & Co. (Contract 643)	2,056 62	
Anderson & Letteney (Contract 644)	1,712 72	
John A. Costello & Co. (Contract 652)	3,375 69	
Advertising	269 37	
Alterations	4,280 53	
Construction	24,052 74	
Damages	5,365 00	
Field supplies	3,238 36	
Fuel	29 40	
Instruments	17 80	
Labor	29,525 11	
Legal and expert advice	1,590 10	
Lighting	2,265 27	
Paving	1,562 34	
Property damages: Takings	100 00	
Rental	590 00	
Skilled service	3,686 78	
Stationery—supplies	228 61	
Teaming	824 66	
Telephone—telegraph	130 69	
Testing	25 81	
Tools	451 72	
Water pipes	4,446 90	
		237,561 63

SECTION G.

(*In Dorchester avenue; between West Fourth street and Old Colony avenue; about 1,280 feet long.*)

Coleman Bros. (Contract 588)	$76,756 26	
Coleman Bros. (Contract 635)	2,998 21	
Carried forward	$79,754 47	$474,998 20

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Brought forward	$79,754 47	$474,998 20
Advertising	98 85	
Alterations	3,352 43	
Construction	27,763 39	
Damages	1,750 00	
Field supplies	571 27	
Fuel	76 90	
Instruments	1 50	
Labor	13,761 42	
Legal and expert advice	19 00	
Lighting	532 71	
Paving	2,980 92	
Property Damages: Takings	436 00	
Rental	40 00	
Skilled service	4,593 37	
Stationery and supplies	210 14	
Teaming	503 99	
Telephone—telegraph	117 33	
Testing	8 67	
Tools	213 72	
Water pipes	1,551 09	
		138,337 17
		$613,335 37

SECTION H.

(*In Dorchester avenue, between Old Colony avenue and Woodward street; 2,200 feet long.*)

Alterations	$69 81	
Damages	2,206 19	
Field supplies	57 19	
Labor	5,243 80	
Lighting	2,366 59	
Paving	8 00	
Property Damages: Takings	775 41	
Skilled service	99 56	
Stationery—supplies	13 15	
Teaming	58 95	
Tools	71 84	
Water pipes	99 74	
	$11,070 23	
Credit:		
T. A. Gillespie Co. (Contract 622)	$21,243 72	
Construction	245 98	
	21,489 70	
		10,419 47
		$602,915 90

SECTION J. (INCLUDES ANDREW SQUARE STATION.)

(*In and near Dorchester avenue and Boston street from about 80 feet north of Dexter street to about 30 feet south of Ralston street; about 1,000 feet long.*)

T. A. Gillespie Co. (Contract 602)	$52,585 53	
Otis Elevator Co. (Contract 619)	37,980 00	
John P. Berry (Contract 633)	2,487 02	
Wm. Crane (Contract 637)	2,605 73	
Galassi Mosaic & Tile Co. (Contract 639)	10,941 43	
Craffey & Keith (Contract 641)	7,987 35	
Carried forward	$114,587 06	$602,915 90

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Brought forward	$114,587 06	$602,915 90
E. Van Noorden & Co. (Contract 643)	1,806 03	
Anderson & Letteney (Contract 653)	1,508 49	
General Construction Co. (Contract 664)	8,932 55	
Advertising	211 96	
Alterations	2,026 64	
Construction	44,974 34	
Damages	650 00	
Field supplies	4,727 51	
Fuel	1,163 32	
Instruments	5 49	
Labor	91,219 92	
Legal and expert advice	1,581 62	
Lighting	2,242 36	
Paving	2,067 76	
Property Damages: Takings	11,723 53	
Rental	208 00	
Skilled service	4,840 21	
Stationery—supplies	298 93	
Stenographers	1 80	
Teaming	2,007 07	
Telephone—telegraph	145 32	
Testing	12 86	
Tools	1,319 77	
Water Pipes	2,115 64	
		300,378 18

BOYLSTON STREET SUBWAY.

Proportion of general expenses, transferred from Dorchester account		5,847 60
Engineering and Miscellaneous Expenses:		
Chief Engineer	$1,125 00	
Field supplies	7,822 85	
Labor	1,917 88	
Legal and expert advice	2 00	
Messengers	4 62	
Skilled service	1,893 01	
Stationery—supplies	21 88	
Teaming	53 32	
Tools	14 72	
	$12,855 28	
Credits:		
Little Building Passageway $1,738 21		
Stock 398 95		
	2,137 16	
		10,718 12

SECTION TWO.

(From the middle of Massachusetts avenue, under private property and Boylston street, to the easterly line of Hereford street.)

Prepayment area	$57,355 88	
Property Damages: Takings	7,707 50	
Teaming	14 00	
	$65,077 38	
Credit:		
Construction	742 44	
		64,334 94
Carried forward		$984,194 74

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Brought forward		$984,194 74

SECTION THREE.

(*From the easterly line of Hereford street, under Boylston street to the westerly end of the Public Library.*)

Construction	$792 10	
Damages	257 75	
		1,049 85

SECTION FOUR.

(*From the westerly end of the Public Library, under Boylston street, to about the center of Arlington street.*)

Damages	1,251 76

EAST BOSTON TUNNEL EXTENSION.

Engineering and Miscellaneous Expenses:		
Field supplies	$51 59	
Niche work	223 63	
Skilled service	78 21	
Stationery—supplies	2 65	
Teaming	1 93	
Tools	5 40	
		363 41

SECTION G.

(*Changes in the Scollay square station and in the existing East Boston Tunnel and all new work from Washington street to Stoddard street.*)

Construction	$11 33	
Damages	281 21	
Property Damages: Takings	2,928 38	
		3,220 92

SECTION H.

(*All work from Stoddard street to Staniford street and including the Bowdoin station.*)

Coleman Bros. (Contract 494)	$2,356 50	
Construction	72 00	
Damages	598 00	
Labor	63 95	
Property Damages: Takings	25,000 00	
Skilled service	13 25	
Teaming	1 50	
		28,105 20

SECTION J.

(*All work west of Staniford street to North Russell street.*)

Coleman Bros. (Contract 514)	$133 56	
Construction	23 33	
		156 89
		$1,018,342 77

INTEREST.

Dorchester Tunnel	412,542 09
Net increase	$1,430,884 86

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SUMMARY.

	From beginning of work to June 30, 1917.	June 30, 1917, to June 30, 1918.	Total.
Subway — Subway Commission	$14,131 16		$14,131 16
Part of General Expenses, Engineering and miscellaneous	117,550 71		117,550 71
Section One	407,475 48		407,475 48
Two	239,407 12		239,407 12
Three	363,605 50		363,605 50
Three and one-half	300,639 36		300,639 36
Four	9,355 70		9,355 70
Five	472,147 31		472,147 31
Six	387,411 49		387,411 49
Seven	327,541 86		327,541 86
Eight	231,504 27		231,504 27
Eight and one-half	95,902 06		95,902 06
Nine	76,639 47		76,639 47
Ten	299,452 07		299,452 07
Eleven	254,497 88		254,497 88
Interest	270,310 57		270,310 57
	258,575 60		258,575 60
	$4,126,147 61		$4,126,147 61
Transfer to Alterations, see 11th report	4 95		4 95
	$4,126,142 66		$4,126,142 66
Alterations — Part of general expenses	$28,945 53		$28,945 53
Section Three	2,568 26		2,568 26
Four	163 42		163 42
Five	30,233 01		30,233 01
Seven	178,516 16		178,516 16
Nine	3 00		3 00
Ten	534 04		534 04
Interest	1,905 56		1,905 56
Transfer from subway, see 11th report	4 95		4 95
	$242,873 93		$242,873 93
Charlestown Bridge: Total	$1,570,197 98		$1,570,197 98
Investigation of Congestion of Traffic, etc.: Total	$3,015 92		$3,015 92
East Boston Tunnel — Part of General Expenses	$161,134 78		$161,134 78
Engineering and miscellaneous	193,657 08	$273 18	193,930 26
Carried forward	$354,791 86	$273 18	$355,065 04

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	From beginning of work to June 30, 1917.	June 30, 1917, to June 30, 1918.	Total.
Brought forward	$354,791 86	$273 18	$355,065 04
Section A	98,869 09		98,869 09
B	1,426,643 08	9,811 84	1,436,454 92
C	508,202 77		508,202 77
D	246,554 26	15 00	246,569 26
E	188,303 27		188,303 27
F	243,686 10		243,686 10
Interest	248,156 88		248,156 88
	$3,315,207 31	$10,100 02	$3,325,307 33
Boston Tunnel & Subway —Part of General Expenses	$226,486 57	$60 64	$226,547 21
Engineering and miscellaneous	419,377 36	84 98	419,462 34
Section One	815,586 82		815,586 82
Two	614,156 25		614,156 25
Three	683,832 90		683,832 90
Four	1,203,988 06	506 43	1,204,494 49
Five	1,080,023 84		1,080,023 84
Six	334,530 37		334,530 37
Seven	139,699 14	24 00	139,723 14
Eight	617,152 07		617,152 07
Nine	678,714 43		678,714 43
Ten	142,835 42		142,835 42
Eleven	345,493 91		345,493 91
Twelve	45,417 52		45,417 52
Interest	648,179 81		648,179 81
	$7,995,474 47	$676 05	$7,996,150 52
Cambridge Connection —			
Office Expenses	$62,355 20		$62,355 20
Engineering and miscellaneous	97,239 24	$30 52	97,269 76
Section One	590,272 24	5 04	590,277 28
Two	625,626 56		625,626 56
Interest	76,722 00		76,722 00
	$1,452,215 24	$35 56	$1,452,250 80
Dorchester Tunnel —			
Office Expenses	$149,461 24	$39,215 69	$188,676 93
Engineering and miscellaneous	730,845 47	77,780 77	808,626 24
Section A	407,322 61	707 74	408,030 35
B	1,165,178 64	* 13,593 66	1,151,584 98
C	406,852 72	1,790 01	408,642 73
D	1,112,632 46	10,940 22	1,123,572 68
E	2,196,776 72	109,784 17	2,306,560 89
F	505,544 82	237,561 63	743,106 45
G	461,240 88	138,337 17	599,578 05
H	862,372 14	* 10,419 47	851,952 67
J	539,875 38	300,378 18	840,253 56
Interest	738,592 43	412,542 09	1,151,134 52
	$9,276,695 51	$1,305,024 54	$10,581,720 05

* Decrease.

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	From beginning of work to June 30, 1917.	June 30, 1917, to June 30, 1918.	Total.
Boylston Street Subway —			
Office Expenses	$71,105 17	$5,847 60	$76,952 77
Engineering and miscellaneous	179,313 92	10,718 12	190,032 04
Section One	753,187 64		753,187 64
Two	780,035 10	64,334 94	844,370 04
Three	583,131 64	1,049 85	584,181 49
Four	1,443,766 03	1,251 76	1,445,017 79
Five	728,719 97		728,719 97
Interest	320,194 59		320,194 59
	$4,859,454 06	$83,202 27	$4,942,656 33
East Boston Tunnel Extension —			
Office Expenses	$33,639 30		$33,639 30
Engineering and miscellaneous	971,787 95	$363 41	972,151 36
Section G	286,354 19	3,220 92	289,575 11
H	598,954 21	28,105 20	627,059 41
J	140,751 44	156 89	140,908 33
Interest	224,138 91		224,138 91
	$2,255,626 00	$31,846 42	$2,287,472 42
Chapter 78 — Resolves of 1913	$389 14		$389 14
Chapter 84 — Resolves of 1913	$636 58		$636 58
Dorchester Tunnel Extension	$520 19		$520 19
Grand Total	$35,098,448 99	$1,430,884 86	$36,529,333 85

The report of the Chief Engineer follows.

GEORGE F. SWAIN
HORACE G. ALLEN
JOSIAH QUINCY
JAMES B. NOYES
DAVID A. ELLIS
} *Boston Transit Commission.*

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REPORT OF THE CHIEF ENGINEER.

BOSTON, June 30, 1918.

GEORGE F. SWAIN, HORACE G. ALLEN, JOSIAH QUINCY, JAMES B. NOYES, DAVID A. ELLIS, *Boston Transit Commissioners:*

GENTLEMEN:— I beg leave to submit the following report for the year ending June 30, 1918.

DORCHESTER TUNNEL.

SECTION D.

A shelter has been constructed leading from the southerly escalator on the easterly side of Atlantic avenue to the glass awning over the sidewalk in front of the South Terminal (railway) station to provide a continuous passageway under cover. This will be appreciated by those leaving the tunnel at the southerly platform of the "South Station Under" for the railway terminal in rainy weather.

REPAVING OVER SECTION D AND OVER THE NORTHERLY END OF SECTION E.

As stated in last year's report, the work of repaving Summer street between South street and Dorchester avenue was about 70 per cent. done at the close of the year ending June 30, 1917. Operations were continued at such a rate that the work was substantially completed on July 16, 1917, the time stated in the contract. Henry S. Clark was the contractor.

SECTION F.

A description of the construction of Section F is contained in the twenty-second and twenty-third annual reports.

During the past year the small amount of work remaining to be done in the tunnels has been finished, and the interior station finish and installation of equipment have been completed. The interior station finish consists of a combination of white plaster, terrazzo and green tile. The ceiling and upper portion of the walls are of white cement plaster. The lower portion is of white, polished terrazzo, with a band of white

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and green ceramic tile and polished terrazzo between the whit terrazzo and the plaster, and another band at the botton between the terrazzo and the granolithic base. The colore band is also carried around the advertising panels.

The surfaces of the platforms and passageways are of grano lithic. The edges of the platforms next to the tracks ar bordered with a strip of white cement six inches wide.

The road bed was constructed by the Boston Elevate Railway Company. The rails are fastened with screw spike to creosoted ties on a crushed stone bed and in the uppe tunnel station the crushed stone is, for sanitary reasons, covere with a smooth layer of concrete which may be washed clean

The structural steel columns supporting the roof are encase in concrete. The doors, ticket offices, and newsstands ar covered with sheet copper, and, with the exception of the oa handrails, there is no exposed woodwork which might catch fire

Plate 2 shows a view looking northerly in the lower level for tunnel trains.

Plate 3 shows a view looking northerly in the upper level for the surface cars.

BROADWAY SURFACE STATION.

Between Broadway and Macallen street, at the west side of Dorchester avenue, a surface transfer station has been built. (See Plate 4.) Passengers may transfer at this point from surface to tunnel cars or the reverse. The station consists of an island platform about 240 feet long, with a maximum width of about 25 feet, protected from the weather by a wood and steel shelter, with pitch and gravel roofing, supported on steel columns. Entrance and exit stairways connect the surface platform with the tunnel station below. The station and tracks are enclosed on the north and south by a paneled concrete fence.

On December 15, 1917, the operation of the Cambridge Subway-Dorchester Tunnel trains was extended from Dewey square through the tunnels under the Fort Point Channel to the Broadway Station. Here passengers may transfer to and from surface cars which enter and leave the upper level of the tunnel station.

SECTION G.

Section G, including the new Dorchester avenue bridge over the tracks of the New York, New Haven & Hartford

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Railroad Company, was substantially completed and the certificate of completion given December 31, 1917. Tracks were laid by the Boston Elevated Railway Company in the incline for surface cars and in the northerly portion of the tunnel in this section before the whole of Section G was completed. This was done to permit the opening of the Broadway Station on December 15th as a temporary terminus of the Dorchester Tunnel, which necessitated the operation of surface cars in the incline from the surface on Dorchester avenue to the upper level of the station, and also the operation of tunnel trains in about 700 feet of the northerly part of this section in order to switch the trains from one track to the other for their return trip.

Plate 5 shows the incline for surface cars.

A description of Section G and methods of construction was given in the twenty-second and twenty-third annual reports.

SECTION J.

The twenty-second and twenty-third annual reports contain a general description of this section. Since the date of the last report the work has been mainly on the interior finish of the tunnel station, known as the Andrew Station, and the construction of the surface station.

The interior finish consists of white cement plaster on the ceilings and the upper portion of the walls, while the lower portion is of white, polished terrazzo with a band of white and yellow ceramic tile together with a band of 3-inch by 6-inch enameled tile between the terrazzo and the plaster and similar bands at the bottom between the terrazzo and the granolithic base. The advertising panels and the terrazzo are also separated by a band of white and yellow ceramic tile. The floors of the passageways are of granolithic and the platforms are of granolithic also, with a border of white cement 6 inches wide next to the train pit. The doors are covered with sheet copper, and the only exposed woodwork in the station are the oak handrails on the stairs which lead from the tunnel station to the passageways and from the passageways to the surface station. Plate 6 shows the easterly platform looking northerly. Plate 7 shows the westerly platform looking northerly. Plate 8 shows the escalators which lead from the westerly platform up to the central platform of the Andrew surface station.

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ANDREW SURFACE STATION.

The interchange of passengers at this station between the surface cars and the trains will be made within an enclosed steel concrete building one story in height. This structure, which is 115 feet wide, has been erected on the property just south of Dexter street and extends from Dorchester avenue to Ellery street, a distance of 297 feet. (See Plate 9.)

The building has a steel framework with reinforced concrete walls and a wooden roof covered with tar and gravel. That the station might be well lighted a monitor roof section was used with a row of windows on each side. Additional illumination is afforded by skylights over each track and by a row of windows in each sidewall.

Two lines of tracks for the accommodation of surface cars extend through the station. (See Plate 10.) This arrangement permits the loading of passengers from a central loading platform. The side platforms, which are slightly narrower, will be used for unloading the passengers. The south unloading platform has four stairways leading to the tunnel station below, while on the north platform there are three stairways. To reach the central loading platform from the station level one four-file escalator and three stairways have been provided.

All exposed concrete surfaces have been given a washed finish and the wood and steel work have been painted a light gray, to match the concrete, except the ceiling between the purlins on the underside of the roof, which has been painted white. The outer walls of the monitor have been covered with gray asbestos shingles. The construction of the building has been done almost wholly by the men employed in the Commission's labor department.

ESCALATORS.

At the close of the year, as stated in the last Annual Report, one double-file cleat type escalator was being installed at Broadway station and two double-file cleat type escalators were being installed at Andrew station. Each escalator has two files and each file is independently driven. (See Plate 8.) The installation has been completed during the year and all the machines have been given the field tests, under the supervision of William W. Lewis, Assistant Engineer.

The motors had previously been subjected, at the works of

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BROADWAY STATION, LOWER LEVEL FOR TRAINS, LOOKING SOUTH.

PLATE 2

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BROADWAY STATION, UPPER LEVEL FOR SURFACE CARS, LOOKING NORTH.

PLATE 3

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BROADWAY SURFACE STATION, LOOKING WESTERLY IN BROADWAY.

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INCLINE LEADING TO THE UPPER LEVEL OF THE BROADWAY STATION IN DORCHESTER AVENUE.

PLATE 5

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ANDREW STATION, EASTERLY PLATFORM, LOOKING NORTH. MAY 8, 1918.

PLATE 6.

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ANDREW STATION, WESTERLY PLATFORM, LOOKING NORTH. JUNE 28, 1918.

PLATE 7

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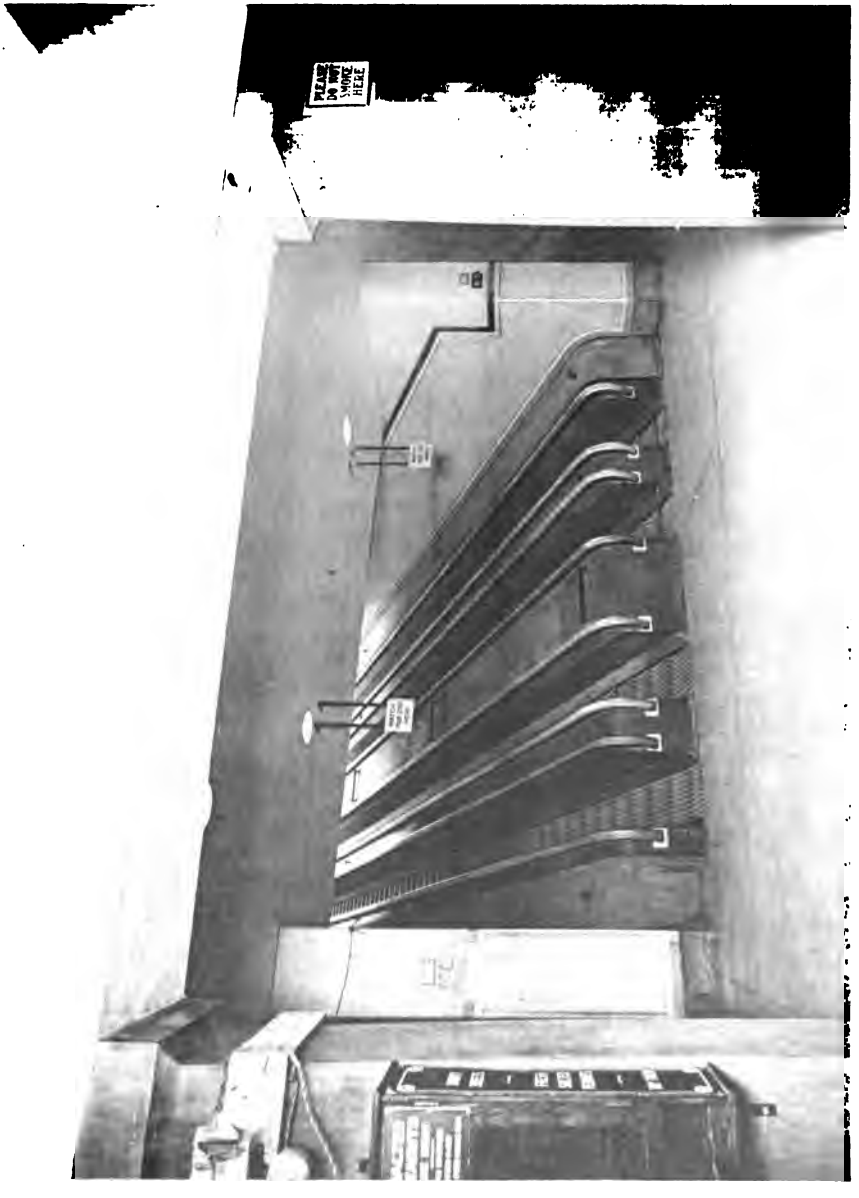

ANDREW STATION ESCALATORS, FROM WESTERLY PLATFORM.

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ANDREW SURFACE STATION. LOOKING WESTERLY FROM DORCHESTER AVENUE.

PLATE 9

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INTERIOR OF ANDREW STATION. LOOKING WESTERLY. TOP OF ESCALATORS WITHIN PARAPET IN FOREGROUND. MAY 16, 1918.

PLATE 10

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the manufacturers, to shop tests with greater loads than in the field tests and had met all the conditions of the specifications satisfactorily.

The field tests consisted in running the machines for eight hours, the first five hours without load and the last three hours with varying loads from about one-quarter load to about full load. The fractional loads were obtained with men and the full load with men carrying cast-iron weights. Observations were made to determine the electrical power consumed, the temperature rise of the different parts of the machine, the speed of the treads, and the efficiency of the brakes.

All the machines satisfactorily passed the field tests. In the following table are given facts about these escalators and the tests:

Contractor—Otis Elevator Company.

Date of Contract — August 17, 1916.

	Broadway Station.		Andrew Station.			
			North Machine.		South Machine.	
Contract price	$22,150.00		$21,100.00		$21,100.00	
Vertical lift	24.7 ft.		23.5 ft.		23.5 ft.	
Capacity, passengers per hour at 140 lbs. per passenger.	7,000		7,000		7,000	
Motor horsepower, each file.	14		14		14	
Speed of motor, rev. per min. at 575 volts.	580		580		580	
	East File	West File	North File	South File	North File	South File
Efficiency guaranteed — (line to load).	38%	38%	38%	38%	38%	38%
Efficiency at test	48.18	49.13	45.3	46.5	44.5	47.4
Date of test	Feb. 13, 1917		June 13, 1918			

Repaving Dorchester Avenue and Boston Street over and Adjacent to Sections F, G and J.

The contract for laying the permanent paving in Dorchester avenue and adjacent streets between West Second street

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and Old Colony avenue was let to the Central Construction Company. The work was begun May 15, 1918, and at the date of this report is about 10 per cent. done. The same firm was also awarded a contract for repaving that portion of Dorchester avenue between Humboldt place and Andrew square, as well as for parts of Boston and Southampton streets where the tunnel was constructed. The work on this contract was begun May 6, 1918, and at the date of this report is about 80 per cent. done. At the request of the Commissioner of Public Works, it was decided to replace the old kind of pavement with recut granite blocks laid with grout joints and a cement sand bed on a concrete base. An agreement was made with the Public Works Department whereby the City is to pay the excess cost of the new improved paving over that of the original kind. In addition, the portion of Andrew square undisturbed by the tunnel work is being repaved with similar paving, the City to pay the expense. The Boston Elevated Railway Company is coöperating by doing all the necessary work on its tracks as required in the progress of the paving operations. This has included the new special work and tracks made necessary by the Andrew Surface Station.

BOYLSTON STREET SUBWAY.

MASSACHUSETTS AVENUE SURFACE STATION.

The Massachusetts Avenue Surface Station was authorized by Chapter 393 of the Acts of the Massachusetts Legislature of the year 1917, in order to provide means for a convenient interchange of passengers between the Boylston Street Subway and the street railway lines.

Plate 11 shows a general plan of the surface station with the track connections and also stairways and passageways for interchange of passengers between the surface lines and the subway.

The plans for the station show a center platform 27 feet wide, between the two tracks. From this platform, stairways and landings connect with both platforms of the Massachusetts Station of the subway directly below. Also there is to be a connection from this center platform of the new station with the ticket office lobby of the Massachusetts subway station.

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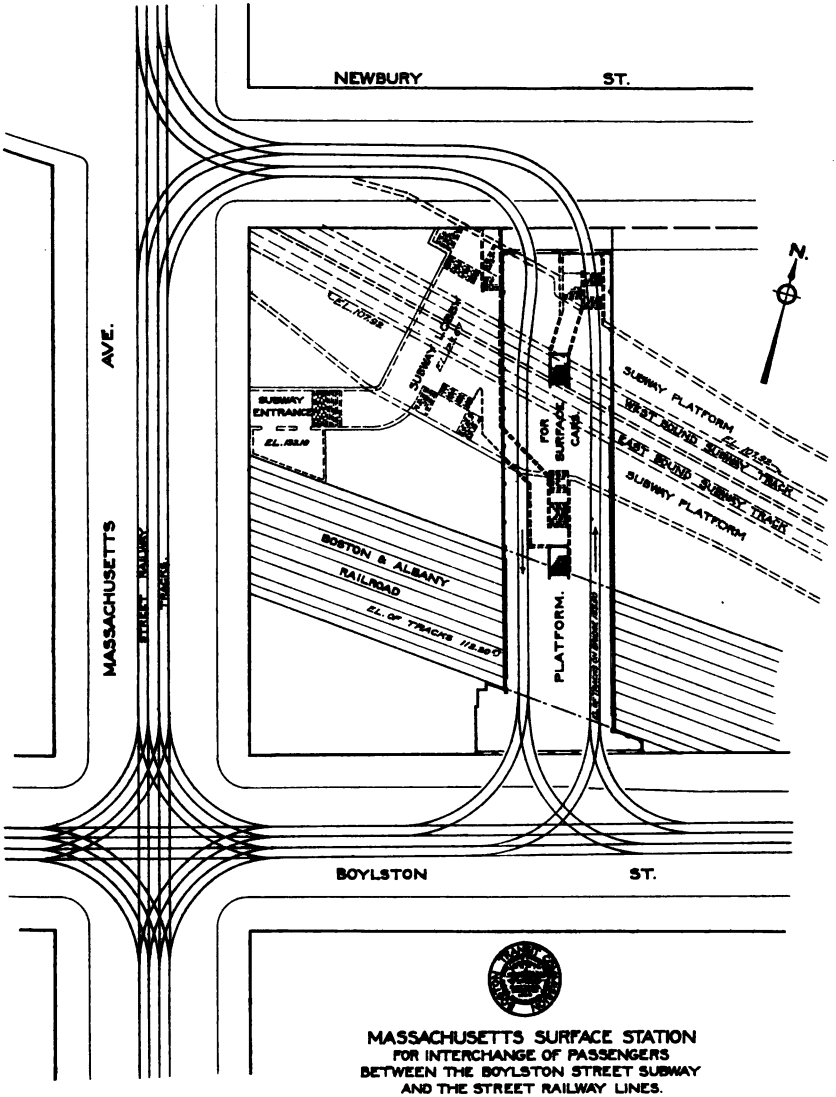

MASSACHUSETTS SURFACE STATION
FOR INTERCHANGE OF PASSENGERS
BETWEEN THE BOYLSTON STREET SUBWAY
AND THE STREET RAILWAY LINES.

Elevations are referred to a datum which is 100.00 feet below mean low water of the sea.

20 0 20 40 60
Scale in feet

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MASSACHUSETTS SURFACE STATION, LOOKING SOUTH FROM NEWBURY STREET, SHOWING PROGRESS OF CONSTRUCTION. JUNE 26, 1918.

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MASSACHUSETTS SURFACE STATION, LOOKING NORTH FROM BOYLSTON STREET, SHOWING PROGRESS OF CONSTRUCTION. JUNE 26, 1918.

PLATE 13

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The plans necessitated the removal of the brick building numbered 981–987 Boylston street, also the two-story brick and wood building in the rear of Public Alley 444 and the two 2-story brick buildings numbered 354 and 356 Newbury street.

Construction was begun on February 4, 1918, at the Newbury street side of the work immediately after the tenants had vacated the buildings.

The construction of the concrete foundations for the stairway leading to the northerly platform of the subway below the basement of 354 Newbury street was finished before the building above was removed, thus enabling the work to proceed during the severe winter weather and at the same time securing the best quality of work. Also the first floor of the building at 356 Newbury street was removed and the structural steel and reinforced platform of the station was built before the removal of the rest of the building, thereby gaining the same advantages as before described.

The lumber of the floors, roofs and partitions of these two buildings is being used for sheeting in excavation work and for forms for concrete in the construction of the station. The bricks of the buildings, which were of good quality, are being used for sidewalk repaving on Sections F, G and J of the Dorchester tunnel. The plumbing and heating fixtures of the buildings were sold to the highest bidders.

Bids for removing the building 981 to 987 Boylston street, above the street floor, were opened March 5, 1918, and the contract was awarded to the American Building Wrecking Company. The work of removing the building was completed on April 9, 1918.

The five Boston & Albany railroad tracks are to be spanned by a steel and reinforced concrete bridge. The construction of the concrete piers, footings for which extend about 18 feet below the grade of the railroad tracks, is in progress. Before beginning the work for the piers, piles were driven to support the two outside tracks of the railroad. The tracks are supported by the stringers under the ties; the ties resting on the pile bent caps which are 12 feet on centers.

The platform of the station is to be built of reinforced concrete and structural steel. The station is to be covered by a steel trussed arch roof, bents to be spaced 17.5 feet on centers supporting the purlins on which is to rest the reinforced concrete roof slab. Plates 12 and 13 show the site of the work

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June 26, 1918. Plate 12 is a view looking from Newbury street southerly towards Boylston street, and Plate 13 is a view looking northerly from Boylston street towards Newbury street.

EAST BOSTON TUNNEL.

The extreme cold weather during the latter part of December, 1917, and the first week in January of the present year was responsible for the freezing and bursting of the two pipe lines in the tunnel through which pipes the water is discharged from the pumpwell to the sewer. Repairs were made as speedily as possible, and both lines were in use again within a very short time.

Grouting of shrinkage cracks and relatively porous places, where small leaks occur in the arch and upper sidewalls, has been carried on at various times throughout the year. Practically all of the grouting has been done between the pumpwell and Webster street on the East Boston end of the tunnel. About 94 cubic yards of neat cement grout made from low alumina cement has been used for this work. The average force employed has been one foreman and fourteen laborers.

The East Boston Tunnel is the first instance of which we have any record of a monolithic concrete tunnel having been built under salt water. It was constructed with the ordinary high alumina Portland cement at a time when there was less knowledge than we now have of the action of sea water on such cement.

There was no waterproofing membrane between the concrete and the surrounding earth to prevent the water from percolating to the outside of the concrete. The leakage into the tunnel, however, is very small. The necessity for continual watchfulness and repair work, including grouting, is stated in a letter to the Commission dated June 30, 1913, from Howard A. Carson, Consulting Engineer, and also in the report by Assistant Engineer Philip B. Walker dated June 27, 1918, entitled "A general summary of all work done by the Boston Transit Commission in part of the East Boston Tunnel since its completion, together with a report on an investigation as to its condition."

The East Boston Tunnel differs from the recently built

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Dorchester Tunnel under Fort Point channel in that the two tubes of the Dorchester Tunnel have an outer shell of hard pine, between which and the concrete there is a waterproof membrane consisting of three layers of asphalt saturated waterproofing fabric with asphalt mopped on to the fabric, so that there are three layers of fabric and four layers of mopped asphalt between the hard pine outer shell and the concrete. A fuller description is given on page 33 of the twenty-second annual report of the Commission. The cement used in the construction of the Dorchester Tunnel was selected cement containing less than 6.5 per cent. of alumina ($Al_2 O_3$), such cement being found by tests, as described on page 53 of the twentieth annual report of the Commission, to better withstand the effects of contact with sea water.

STOCKYARD AT C AND CYPHER STREETS, SOUTH BOSTON.

Assistant Engineer in charge: Philip B. Walker.

The demands upon the stockyard the past year have been rather light owing to the completion of the greater part of the Dorchester Tunnel. A small labor force has been continuously employed to furnish bent rods, unload cement, handle structural steel and to make such other deliveries as were necessary. The greater number of the laborers usually employed in this department have been employed on such parts of the construction work as came directly under the supervision of the Commission.

During the period covered by this report, materials have been received at the stockyard as follows:

Asphalt for waterproofing	27 tons
Waterproofing fabric	9,500 sq. yds.
Steel reinforcing rods	30 tons
Structural steel and iron	197.5 tons
Cement	22,431 bbls.
Sewer castings	5 tons

All of the cement and most of the structural materials were received in railroad cars placed directly on the Commission's siding. A total of 110 cars were received and unloaded.

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Deliveries were made to various parts of the work under construction as follows:

Asphalt for waterproofing	27 tons
Waterproofing fabric	15,000 sq. yds.
Steel reinforcing rods	230 tons
Structural steel and iron	222.5 tons
Cement	16,525 bbls.
Sewer castings	13 tons

CEMENT TESTING DEPARTMENT AND CHEMICAL LABORATORY.

Cement Testing.— During the past year samples have been tested from about 27,000 barrels of cement for use on the Dorchester Tunnel. The regular tests have been as follows: Soundness by the boiling test; Fineness by the 100 and 200-mesh sieves; Setting time by the Gilmore needles; Tensile strength of neat briquettes at the ages of 24 hours, 7 days and 28 days, and of mortar briquettes, made in the proportion, by weight, of 1 part of cement to 3 parts of Standard Ottawa sand, at the ages of 7 days and 28 days.

Other Tests.— Routine tests on concrete aggregates, waterproofing materials, water samples, etc., have been made in a similar manner to those described in the twenty-third annual report. No new investigations have been started, but all long time tests have been continued and some retests made.

STRUCTURAL STEEL SHOP.

Assistant Engineer in charge: Ernest R. Springer.

The shop has fabricated practically all the steelwork used in the different sections. This includes steel for the bridge on Dorchester avenue over the New York, New Haven & Hartford Railroad tracks, the surface car station at Andrew square, part of the steel that will be required for the Massachusetts Surface Station, as well as the steel for shelters, fences, stairways and other miscellaneous work.

Most of the steelwork has been erected by men from the shop, who in addition have done the painting of the steelwork and the under side of the roofs of the Andrew Surface Station and the Broadway Shelter.

The total number of skilled iron workers employed in the shop and on erection has varied from 12 to 16 men, with a present force of 13 men.

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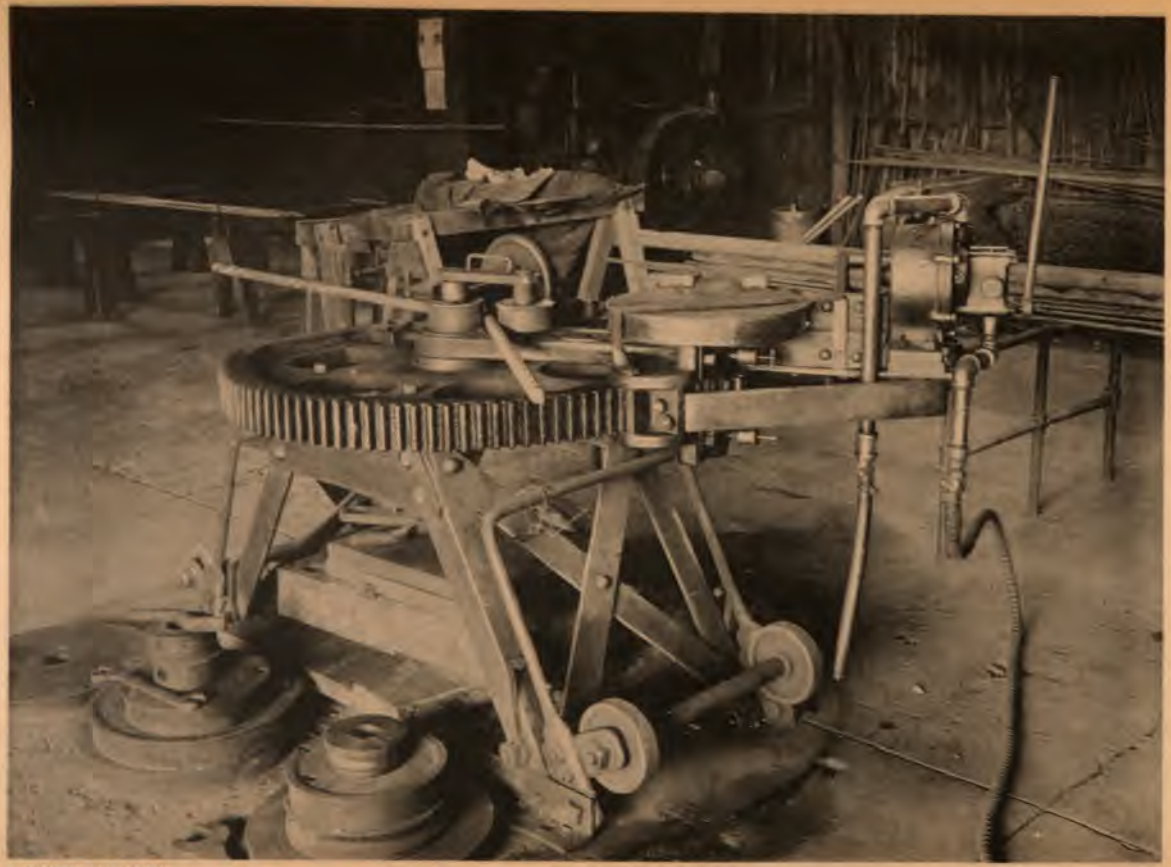

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POWER ROD-BENDING MACHINE.

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The following tabulation gives the output for the above period:

DORCHESTER TUNNEL.

Section D.

Shelter at Dewey square . . 1,166 lbs. fabricated, or about ½ ton.

Section F.

Shelter at Broadway Surface Station . . . . . 31,402 lbs. fabricated and erected, or about 15¾ tons.

Section G.

Bridge over New York, New Haven & Hartford R. R. . . 101,479 lbs. fabricated, or about 50¾ tons.

Section J.

Andrew Surface Station . . 203,848 lbs. fabricated and erected, or about 102 tons.

BOYLSTON STREET SUBWAY.

Boylston Station.

Iron stairway and changes . . 5,268 lbs. fabricated and erected, or about 2½ tons.

Massachusetts Surface Station.

Girders, trusses, columns and beams . . . . . 299,036 lbs. fabricated and partly erected, or about 149½ tons.

Total for year — 642,199 lbs., or about 321 tons.

The power rod-bending machine, shown by Plate 14, designed and begun by the late A. W. Parker, steel inspector, has been completed by S. C. Lyman at the Commission's steel shop and has been in operation for several months.

All shapes and sizes of reinforcing rods, up to and including 1¼ inches, have been bent successfully, to as small as three (3) inch radius.

The table of the bender is composed of a large gear wheel with a movable arm pinned through the hub. This movable arm, which holds the rolls for the bending and also the spur gear and pinion for revolving around the large gear, is operated by a Chicago Pneumatic Tool Company No. 1 Pneumatic Hoist Motor of 1½ H. P. with a speed of 660 revolutions per minute under load. Keyed to the motor shaft is a worm engaging the spur gear. The worm and spur gears, which run in an oil bath, are entirely enclosed, thus protecting the operator.

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The machine, when in operation, requires one man at the throttle and two men to handle the rod being bent. This is a considerable saving over the old lever and arm method, and cuts down the number of men required from about seven to three.

SUBWAYS AND TUNNELS BUILT BY THE COMMISSION.

In the following tabulated form is given statistical data relating to the different subways and tunnels which have been built by the Commission in the City of Boston.

The Tremont Street Subway as originally built has undergone several extensive changes. First, at the Pleasant Street incline alterations were made for the use of elevated trains and then later the incline was restored for the use of surface cars. The line from Pleasant Street to the North Station was operated with elevated trains from June 10, 1901, to November 30, 1908. Second, at Haymarket Square the station was considerably enlarged and altered on account of the Washington Street Tunnel. Third, the Park Street Station platforms were enlarged and straightened to better accommodate the increasing traffic. These changes were authorized by the Legislature on account of the Dorchester Tunnel. Fourth, a new incline with 4 per cent. grade in Boylston Street, as widened, was constructed in connection with the building of the Boylston Street Subway and the old incline with 5 per cent. grade in the Public Garden was filled with earth. Fifth, the Scollay Square Station was enlarged in connection with the construction of the East Boston Tunnel Extension, which was built below it. Sixth, the westerly end of the East Boston Tunnel was changed to connect with the East Boston Tunnel Extension. The figures given in the table are for the structures as they stand at the date of this report.

In stating the length of the Dorchester Tunnel the portion from Summer street near "South Station Under" to the Broadway Station in South Boston, a distance of about 3,800 feet, is counted as one two-track tunnel. This portion, however, consists of two separate tubes, one for each track.

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	Date of Beginning.	Opened for Traffic.	Lengths.		Approximate Cost.
			Feet.	Miles.	
			About		
Tremont Street Subway	March 28, 1895.	*September 3, 1898.	8,900	1.68	$4,369,000.00
East Boston Tunnel	May 5, 1900.	December 30, 1904.	7,480	1.42	3,325,000.00
Washington Street Tunnel	October 6, 1904.	November 30, 1908.	6,110	1.16	7,996,000.00
Cambridge Connection	September 29, 1909.	March 23, 1912.	2,486	.47	1,452,000.00
Boylston Street Subway	March 12, 1912.	October 3, 1914.	7,937	1.50	4,943,000.00
East Boston Tunnel Extension	November 29, 1912.	March 18, 1916.	‡2,169	.41	2,287,000.00
Dorchester Tunnel	May 30, 1912.	†June 29, 1918.	11,911	2.26	10,582,000.00

* Tremont Street Subway opened to Park Street
via Boylston Street ..... September 1, 1897
via Pleasant Street ..... September 30, 1897
to the North Station ..... September 3, 1898
Park Street Station enlargement opened ..... March 8, 1915
† Dorchester Tunnel opened to Washington Station ..... April 4, 1915
South Station Under ..... December 3, 1916
Broadway Station ..... December 15, 1917
Andrew Station ..... June 29, 1918

‡ In addition a length of 364 feet of the East Boston Tunnel was changed, in grade and otherwise, as a part of the East Boston Tunnel Extension.
Total length of subways and tunnels is 8.9 miles.
Length of tracks in the subways and tunnels is about 19.27 miles.

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About 3,300 feet of the Tremont Street Subway was built wide enough for four tracks and about 640 feet of it for three tracks. Nearly all of the remainder is 2-track subway.

The combined length of the East Boston Tunnel and the East Boston Tunnel Extension is 9,649 feet or 1.83 miles.

The combined length of the Cambridge Connection and the Dorchester Tunnel is 14,397 feet or 2.73 miles. These two parts, in Boston, are operated with trains by the Boston Elevated Railway Company in connection with its Cambridge Main Street Subway. The combined length of the lines thus operated from Harvard Square in Cambridge to the southerly end of the Dorchester Tunnel near Andrew Square in South Boston is about 5.71 miles.

ENGINEERING FORCE.

The names of all who have been employed in the Engineering Department for more than one month during the past year are given in Appendix C. Two-thirds of the force employed a year ago have left the employ of the Commission, many of them entering the service of the United States or being engaged by firms doing construction work for the Government. I am indebted to all of them for their cooperation.

Respectfully submitted,

EDMUND S. DAVIS,
Chief Engineer.

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APPENDIX A.

[GENERAL ACT, CHAP. 24.]

AN ACT RELATIVE TO THE TRANSFER OF EMPLOYEES AND LABORERS IN THE SERVICE OF THE BOSTON TRANSIT COMMISSION.

Be it enacted, etc., as follows:

Chapter eighty-six of the General Acts of nineteen hundred and seventeen is hereby amended by striking out all after the enacting clause and substituting the following:— Engineers, draftsmen, laborers and all other employees who were in the employ of the Boston transit commission on the first day of January, nineteen hundred and eighteen, may, if citizens of the United States, be transferred to the employ of any city or town in the metropolitan district without examination, and notwithstanding any restriction in the civil service laws or regulations applicable to such transfers, provided that a request to such effect be made by the head of a department in any such city, with the approval of the mayor, or by the chairman of the board of selectmen in any such town. [*Approved February 25, 1918.*

APPENDIX B.

[SPECIAL ACT, CHAP. 185.]

AN ACT TO PROVIDE FOR THE TRANSFER OF THE POWERS OF THE BOSTON TRANSIT COMMISSION TO THE CITY OF BOSTON.

Be it enacted, etc.:

SECTION 1. Upon the expiration of the term of office of the Boston transit commission the city of Boston shall have all the powers and privileges and be subject to all the duties, restrictions and liabilities heretofore conferred or imposed upon the commission and remaining in effect at the date of the passage of this act, the said powers and duties to be exercised and performed by the mayor, commissioner of public works, and city treasurer, or by such person or persons, not exceeding three, as may be appointed by the mayor, subject to the provisions of chapter 486 of the acts of 1909 and acts in amendment thereof and in addition thereto. The persons so appointed shall receive such compensation for their services as the mayor and city council shall determine.

SECTION 2. This act shall take effect upon its passage.

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APPENDIX C.

The names of all the assistants who have been employed in the Engineering Department for more than one month during the past year, together with an indication of some of the work on which each has been engaged, are given below. Many have recently been given an indefinite leave of absence in order that they may engage on work for the U. S. Government.

Assistant Engineers.

* LEON N. ALBERTS,	Plans and studies, Dorchester Tunnel.
JAMES D. BURNS,	Plans for steelwork.
* FRANCIS V. CAREY,	Plans, Dorchester Tunnel and Massachusetts Surface Station; lines and grades for paving, Sections C, D and E, Dorchester Tunnel.
WILBUR W. DAVIS,	In charge of construction, Section G, Dorchester Tunnel, and of Massachusetts Surface Station on the Boylston Street Subway.
* G. DANA EMERSON,	In charge of construction, Section F, Dorchester Tunnel.
ROBERT B. FARWELL,	In charge of construction, Section J, Dorchester Tunnel and paving over the tunnel.
* JAMES T. FRAME,	In charge of Broadway Station finish on Section F, and of paving over part of Dorchester Tunnel.
LEONARD B. HOWE,	Steel and concrete design, Dorchester Tunnel and Massachusetts Surface Station.
WILLIAM W. LEWIS,	In charge of surveys and plans, Dorchester Tunnel, and of miscellaneous office work.
* ROY M. LOTHROP,	Plans, Dorchester Tunnel and Massachusetts Surface Station.
* CLARENCE D. MAYNARD,	Field work for construction of Section J, Dorchester Tunnel.
† PHILIP C. NASH,	Field work for construction of Section G, Dorchester Tunnel.
* ROLAND B. RAND,	Designs for steel and concrete structures.
ERNEST R. SPRINGER,	Designs for steel and reinforced concrete structures and in charge of steel construction.
* GEORGE H. STEARNS,	In charge of designs for steelwork and reinforced concrete structures.

* Left the employ of the Commission or given leave of absence.
† Left to enter war service.

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HERBERT R. STEARNS,	Designs, plans and construction, Dorchester Tunnel.
* ROBERT K. TAYLOR,	Paving, Sections C, D and E, Dorchester Tunnel.
* PHILIP B. WALKER,	In charge of work at stockyards at Cypher street and at Canal street, also of grouting work in East Boston Tunnel.

Draftsmen.

* RALPH A. FISHER,	Steel detail work at Cypher-street stockyard, for Dorchester Tunnel and for Massachusetts Surface Station.
* W. ANTHONY FORD,	Plans, tracing and lettering.
GEORGE P. GOODMAN,	Drafting and photography.
SAMUEL C. LYMAN,	Steel detail and fabrication work at Cypher-street stockyard, for the Dorchester Tunnel and for Massachusetts Surface Station.
* EDMUND A. RICE,	Plans, Dorchester Tunnel and Massachusetts Surface Station.
* CHESTER A. RICHARDSON,	Plans and structural designs for Dorchester Tunnel.
FREDERIC W. STILES,	Plans, miscellaneous line and grade work, force accounts, etc.
* JOHN M. WISEMAN,	Plans for steelwork.

Assistants, Instrumentmen and Others.

* RICHARD A. CASWELL,	Plans, Section J, Dorchester Tunnel.
* HENRY L. CROCKER,	Line and grade work, Section F, Dorchester Tunnel.
LESTER S. DANIELS,	Line and grade work, Section J, Dorchester Tunnel.
* JOHN P. FARRELL,	Line and grade work, Section J, Dorchester Tunnel.
LEONARD H. LEVISON,	Line and grade work, Section G, Dorchester Tunnel and Massachusetts Surface Station.
† ARTHUR V. LYNCH,	Construction, Section F, Dorchester Tunnel, and stairway changes at Boylston Street station of Tremont Street Subway.
HARRY H. LYNN,	Line and grade work, Sections F and G, Dorchester Tunnel.
* MORA L. MILLER,	Line and grade work, Section G, Dorchester Tunnel.
* WILLIAM G. NORTEMAN,	Section F, Dorchester Tunnel.
EDISON F. SAWYER,	Line and grade work, Section G, Dorchester Tunnel and Massachusetts Surface Station.

* Left the employ of the Commission or given leave of absence.
† Left to enter war service.

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† HARRY H. THORBURN,	Line and grade work, Section G, Dorchester Tunnel.
† CHESTER C. TOPHAM,	Sections E, F and J, Dorchester Tunnel.
* FRED E. WEBBER,	Figuring layout of reinforcing rods for bending at Cypher-street stockyard.
* WILLIAM L. WRIGHT, JR.,	Broadway surface station. Record plans, Dorchester Tunnel.

Assistant Engineers Who Are Also Inspectors.

FREDERICK C. H. EICHORN,	Inspection, Section G, Dorchester Tunnel; construction work for Massachusetts Surface Station.
* PERCIVAL H. MOSHER,	Inspection, Sections F and G, Dorchester Tunnel.
LEO S. STONE,	Inspection, Section J, Dorchester Tunnel.

Inspectors.

* WILLIAM G. DOHERTY,	Inspection, passageway from Boylston-street station to the Little Building.
JOSEPH J. JOLLEY,	Concrete mixing and grouting, Section G, Dorchester Tunnel, and Massachusetts Station.
* AUSTIN E. JOYCE,	Paving, Sections C, D and E, Dorchester Tunnel.
THOMAS H. KEENAN,	Grouting, Section B, East Boston Tunnel.
* HERBERT D. LEARY,	Section J, Dorchester Tunnel.
* THOMAS J. MAGNER,	Grouting, Section B, East Boston Tunnel.
* JOSEPH E. REINHALTER,	Section G, Dorchester Tunnel.
* JOHN F. WATERS,	Concrete mixing for Sections F and J, Dorchester Tunnel.

Testing Material.

† SETH M. BRYANT,	Testing Cement.

Clerical Force.

* GEORGE E. CARROLL,	Clerk and stenographer.
ARTHUR B. CARTER,	Secretary to the Chief Engineer.
† HARRY E. CASEY,	Clerk and stenographer.
* EBEN B. DRAPER,	Temporary stenographer.
KATHERINE I. DRISCOLL,	Clerk and stenographer.
* CHARLES E. FAY,	Messenger in drafting room, blueprinting, care of plans.
* GEORGE E. FREDERICKSON,	Clerk and stenographer at Cypher-street stockyard.
† FRANCIS J. KURRISS,	Clerk and stenographer.
† THOMAS J. MULDOON,	Clerk and stenographer at Cypher-street stockyard.
† THOMAS J. PETTIT,	Clerk and stenographer.
† JOHN E. RYAN,	Clerk and stenographer.
* FRANK A. SMITH,	Clerk and bookkeeper at Cypher-street stockyard.

* Left the employ of the Commission or given leave of absence.
† Left to enter war service.

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APPENDIX E.

CANVASS OF BIDS FOR CONCRETE FOUNDATIONS FOR THE ANDREW SURFACE STATION OF THE DORCHESTER TUNNEL. JULY 17, 1917.

BIDDER.	Excavating 500 linear feet trench to grade shown on plans, for foundations of exterior walls and columns.	Excavating 26 pier holes to grade shown on plans, for foundations of interior columns.	Furnishing, hauling and putting in place 200 cubic yards concrete for foundations and walls.	Setting in place 3 tons reinforcing rods, furnished by the Commission.	Total.
	Item a	b	c	d	
Hugh Nawn Contracting Co.,					
82 Savin Street,	$0.90	$4.50	$15.00	$10.00	
Roxbury, Mass.....	450.00	117.00	3,000.00	30.00	$3,597.00
T. A. Gillespie Company,					
363 Dorchester Avenue,	1.00	3.00	14.00	15.00	
South Boston, Mass.....	500.00	78.00	2,800.00	45.00	3,423.00
T. J. O'Connell,					
10 Radcliffe Road,	1.20	1.00	11.50	5.00	
Allston, Mass.....	600.00	26.00	2,300.00	15.00	2,941.00
William Crane,					
Hayward Street,	0.60	3.00	12.50	15.00	
Cambridge, Mass.....	300.00	78.00	2,500.00	45.00	2,923.00

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NDIX F.

SANITARY BASE

AT.			
Grey cement			Grand total.
e			
500 sq. yds.	5	ew.	
$0.60			
300.00			
—			
—		45.75	$21,745.75
0.58			
290.00			
—			
—		27.50	21,697.50
0.65			
325.00			
—			
—		00.00	20,694.00
0.50			
250.00			
—			
—		19.75	17,203.25

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EN

TH			
E			
ow.			GRAND TOTAL.
e			
yds			
3.75			
1.25			$38,050.75
4.45			
7.20			32,279.80
3.00			
0.00			32,020.75
4.25			
3.75			30,184.00
5.00			
5.00			28,558.00

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APPENDIX O.

CANVASS OF BIDS FOR FURNISHING AND ERECTING OAK HANDRAILS COMPLETE WITH BRONZE BRACKETS AND BRONZE SOCKETS IN THE ANDREW STATION OF THE DORCHESTER TUNNEL. DECEMBER 13, 1917.

BIDDER.	750 lin. ft. 2″ oak handrail.	500 lin. ft. 2½″ oak handrail.	176 bends in 2″ oak handrail.	96 bends in 2½″ oak handrail.	162 bronze brackets.	84 bronze sockets.	Total.
	Item a	b	c	d	e	f	
Herbert W. Doten,							
200 Devonshire Street,	$0.49	$0.63	$1.42	$1.50	$2.65	$2.00	
Boston, Mass	367.50	315.00	249.92	144.00	429.30	168.00	$1,673.72
O. H. Drisko & Son,							
166 Devonshire Street,	0.40	0.46	1.49	1.82	2.64	2.03	
Boston, Mass	300.00	230.00	262.24	174.72	427.68	170.52	1,565.16
Anderson & Letteney,							
19 Wareham Street,	0.45	0.50	1.00	1.70	2.50	1.96	
Boston, Mass	337.50	250.00	176.00	163.20	405.00	164.64	1,496.34

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APPENDIX P.

CANVASS OF BIDS FOR LAYING ABOUT 1,150 LINEAR FEET OF 12-INCH WATER PIPE IN A STREET, BETWEEN WEST FIFTH STREET AND WEST SECOND STREET, AND IN WEST SECOND STREET, BETWEEN A STREET AND GRANITE STREET, ALL IN SOUTH BOSTON. DECEMBER 13, 1917.

BIDDER.	Price.	Amount.	Time of Completion.
James Barletta, 364 Hanover Street, Boston, Mass.	$3.49	$4,013.50	April 1, 1918.
Anthony Baruffaldi, 9 Parker Place, Somerville, Mass.	3.44	3,956.00	In 35 working days.
V. Grande, 59 Hull Street, Boston, Mass.	2.95	3,392 50	March 1, 1918.
M. De Sisto, 198 LaGrange Street, West Roxbury, Mass.	2.90	3,335.00	February 1, 1918.
John A. Costello & Company, 24 Smith Street, Roxbury, Mass.	2.83	3,254.50	In 30 days after starting.

APPENDIX Q.

CANVASS OF BIDS FOR REMOVING THE THREE-STORY BRICK BUILDING NUMBERED 1 A STREET, AT THE NORTHEAST CORNER OF A AND W. FIFTH STREETS, SOUTH BOSTON. JANUARY 3, 1918.

BIDDER.	Price.	Time of Completion.
New England Contracting Co., Third and Maple streets, Chelsea, Mass.	$176.00	Feb. 15, 1918.
Swift-McNutt Co., 70 Devonshire street, Boston, Mass.	164.00	30 working days.
American Bldg. Wrecking Co., 75 First street, East Cambridge, Mass.	155.00	Feb. 15, 191 .
Sterman Bros., Cor. Carter & Vale streets, Chelsea, Mass.	120.00	13 working d vs.

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1917.

Bidder.	Catch-basin, brick masonry. 4 cu. yds., more or less.	Old masonry removed. Per cu. yd.	Total.
	j	k	
	1 C. B.	30 Cu. yds.	
William Crane, Hayward Street, Cambridge, Mass.....	$100.00 100.00	$12.00 360.00	$16,616.00
Coleman Bros., Marginal Street, Chelsea, Mass.....	100.00 100.00	7.00 210.00	12,409.00
Hugh Nawn Cont. Co., 82 Savin Street, Roxbury, Mass.....	125.00 125.00	10.00 300.00	11,706.55
Henry S. Clark, 11 Montague Street, Dorchester, Mass.....	85.00 85.00	6.00 180.00	9,106.50
Hoff & Wells Const. Co., Old South B'l'd'g., Boston, Mass.....	100.00 100.00	2.50 75.00	7,463.00
James A. Sullivan, 35 Melville Ave., Dorchester, Mass.....	140.00 140.00	1.50 45.00	6,647.00

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APPENDIX I.

CANVASS OF BIDS FOR REPAVING BOYLSTON STREET OVER PASSAGEWAY FROM BOYLSTON STATION TO THE LITTLE BUILDING.
AUGUST 11, 1917.

BIDDER.	140 sq. yds., more or less, wood block paving on 6" concrete base.	50 lin. ft., more or less, resetting granite edge-stone.	10 sq. yds., more or less, granolithic sidewalk, including cinder or gravel base.	Total.
Coleman Brothers,				
1 Marginal Street,	$5.00	$0.50	$2.25	
Chelsea, Mass.....	700.00	25.00	22.50	$747.50
Henry S. Clark,				
11 Montague Street,	5.00	0.20	2.00	
Dorchester, Mass....	700.00	10.00	20.00	730.00

Time of Completion, August 19, 1917.

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CAST FRAMES IN

	1 door and frame, type J.
	j
	$150.00
A. C.	150.00
27	75.00
	75.00
	89.00
E. B.	89.00
63	74.00
	74.00
	97.00
Penn	97.00
20	47.00
	47.00
	71.00
E. V.	71.00
10	61.00
	61.00

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CANVASS OF BIDS FOR FU[illegible]HE BROADWAY STATION OF THE

BIDDER.	Time of Completion.
O. H. Drisko & Son, 166 Devonshire Street, Boston, Mass.....	[illegible] in about 4 weeks from time walls [illegible]dy, centre rail and posts in about [illegible]ks from time stairways are ready.
Anderson & Letteney, 19 Wareham Street, Boston, Mass.....	[illegible]er 23, 1917.

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APPENDIX M.

CANVASS OF OFFERS OF LUMP SUM PRICES TO BE PAID TO THE BOSTON TRANSIT COMMISSION FOR REMOVING THREE-STORY BRICK BUILDING NUMBERED 1 A STREET, AT NORTH-EAST CORNER OF A AND WEST FIFTH STREETS, SOUTH BOSTON. NOVEMBER 13, 1917.

BIDDER.	Price.	Time of Completion.
Daniel J. Collins, 76 Broadway, South Boston, Mass.	$25.00	November 20, 1917.
Commonwealth Building Wrecking Co., 94 Old Colony Avenue, South Boston, Mass.	140.00	December 1, 1917.
New England Building Wrecking Co., Inc., 6 Webber Street, Boston, Mass.	145.00	Thirty days from start.
Swift-McNutt Co., 70 Devonshire Street, Boston, Mass.	150.00	Twelve days from receipt of signed accepted contract.
American Building Wrecking Co., 75 First Street, East Cambridge, Mass.	155.00	In thirty days.
New York Building Wrecking Co., 43 Tremont Street, Boston, Mass.	162.50	Not stated.
Bay State Contracting Co., 14 Auburn Street, Chelsea, Mass.	206.00	November 30, 1917.
Sterman Bros., Carter & Vale Streets, Chelsea, Mass.	215.00	In twenty-one working days.
New England Contracting Co., Maple & Third Streets, Chelsea, Mass.	325.00	Not stated.
Wm. G. Greene & Sons, 26 Hampshire Street, Cambridge, Mass.	415.00	November 30, 1917.

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APPENDIX N.

CANVASS OF BIDS FOR FURNISHING AND PUTTING IN PLACE TAR AND GRAVEL ROOFING ON THE BROADWAY SURFACE STATION OF THE DORCHESTER TUNNEL. NOV. 20, 1917.

BIDDER.	Amount.	Time of Completion.
Thomas L. Ormsby, 350 Broadway, South Boston, Mass.....	$867.00	Not stated.
Thomas J. Hind, 19 Milk Street, Boston, Mass.....	865.00	10 days after beginning work.
H. A. Banash & Son, 90–92 Dudley Street, Roxbury, Mass.....	800.00	In five working days.
W. A. Murtfeldt Co., 161 Devonshire Street, Boston, Mass.....	687.00	In ten working days.
John C. Finegan Co., 462 E. First Street, South Boston, Mass.....	635.00	One week from date of beginning work.
Eagle Cornice & Skylight Wks., Tudor Street, Cambridge, Mass.....	585.00	Not stated.

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CANVASS OF BIDS FOR MER[illegible]OYLSTON ST. SUBWAY. FOR IMMEDIATE DELIV[illegible] JANUARY 17, 1918.

BIDDER.	PRICE PER LB.		
	31,500 lbs. 7″ x 15 lbs. I-Beams; 60 pcs. 35′ long.	8,873 lbs. 7″ x 9.75 lbs. Channels; 26 pcs. 35′ long.	Total.
W. E. Clark & Co., 120 Milk St., Boston, Mass.	$0.055 1,732.50	$0.055 488.02	$5,141.00
A. C. Harvey Co., 374 Congress St., Boston, Mass.	0.05 1,575.00	0.05 443.65	4,498.28
Carnegie Steel Co., 120 Franklin St., Boston, Mass.	*0.04195 1,321.43	*0.04195 372.22	3,786.23
Estimated freight from			100 00
			$3,886.23

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APPENDIX S.

CANVASS OF BIDS FOR FURNISHING AND ERECTING 17 SKYLIGHTS IN THE ANDREW SURFACE STATION OF THE DORCHESTER TUNNEL.
JANUARY 17, 1918.

BIDDER.	Amount.	Time of Completion.
E. B. Badger & Sons Co., 75 Pitts street, Boston, Mass.	$2,875.00 16-oz. copper. 1,695.00 galvanized iron.	14 working days.
E. Van Noorden & Co., 100 Magazine street, Roxbury, Mass.	2,645.00 copper. 1,475.00 galvanized iron.	Two weeks.
The T. J. Flynn Metal Wks. Inc., Albany & Portland streets, Cambridge, Mass.	2,413.00 16-oz. copper. 1,183.00 galvanized iron.	15 days.
T. C. Brooks Co., Inc., 320 Dover street, Boston, Mass.	2,293.00 16-oz. copper. 1,481.00 galvanized iron.	15 to 18 days.
S. D. Hicks & Son, 9 Bowker street, Boston, Mass.	2,090.00 copper. 1,235.00 galvanized iron.	14 days.

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APPENDIX T.

CANVASS OF BIDS FOR 78 SASHES (52 SLIDING, 26 FIXED IN PLACE), FIRST QUALITY COUNTRY PINE, GLAZED WITH PLAIN SINGLE THICK GLASS, FOR ANDREW SURFACE STATION OF DORCHESTER TUNNEL. JANUARY 31, 1918.

BIDDER.	Lump Sum Price.	Time of Delivery.
A. W. Hastings & Co., 134–142 Friend Street, Boston, Mass.	$505.00	Frames: 7 working days from receipt of order. Sashes: 14 working days from receipt of order.
Lovell & Hall, 94–100 Portland Street, Boston, Mass.	494.00	Frames: inside of 2 weeks. Sashes: 2 weeks and 3 days.
Jackson & Newton Co., 105–107 Portland Street, Boston, Mass.	* 475.00	Two weeks from receipt of order.
The Brockway-Smith Corp'n., 98 Canal Street, Boston, Mass.	445.00	Two weeks from receipt of order.
** Jackson & Newton Co., 105–107 Portland Street, Boston, Mass.	414.00	Two weeks from receipt of order.

* Clear pine.

** Awarded.

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APPENDIX U.

CANVASS OF BIDS FOR 84 DOUBLE HUNG WINDOWS AND 3 TRANSOMS (PARTING BEADS, PULLEY STILES AND HEADERS TO BE HARD PINE; ALL ELSE TO BE FIRST QUALITY COUNTRY PINE), GLAZED WITH PLAIN, SINGLE THICK GLASS, FOR ANDREW SURFACE STATION OF DORCHESTER TUNNEL. JANUARY 31, 1918.

BIDDER.	Lump Sum Price.	Time of Delivery.
The Brockway-Smith Corp'n, 98 Canal Street, Boston, Mass.	$750.00	Two weeks from receipt of order.
Lovell & Hall, 94–100 Portland Street, Boston, Mass.	725.00	Frames: Inside of 2 weeks. Sashes: 2 weeks and 3 days.
A. W. Hastings & Co., 134–142 Friend Street, Boston, Mass.	682.00	Frames: 7 working days from receipt of order. Sashes: 14 working days from receipt of order.
** Jackson & Newton Co., 105–107 Portland Street, Boston, Mass.	* 667.00	Two weeks from receipt of order.
Jackson & Newton Co., 105–107 Portland Street, Boston, Mass.	627 00	Two weeks from receipt of order.

* For clear pine. ** Awarded.

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APPENDIX V.

CANVASS OF BIDS FOR FURNISHING AND PUTTING IN PLACE TAR AND GRAVEL ROOFING ON THE ANDREW SURFACE STATION OF THE DORCHESTER TUNNEL. FEBRUARY 5, 1918.

BIDDER.	Lump Sum Bid.
Thomas J. Hind, 19 Milk Street, Boston, Mass.	$4,000.00
W. A. Murtfeldt Co., 161 Devonshire Street, Boston, Mass.	3,950.00
John C. Finegan Co., 462–472 East First Street, South Boston, Mass.	3,374.00
Robert E. Comins, 267 Farrington Street, Quincy, Mass.	3,322.00
Eagle Cornice & Skylight Works, 28 Tudor Street, Cambridge, Mass.	3,266.00
Columbia Cornice Co., 120 Hampshire Street, Cambridge, Mass.	3,027.00

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APPENDIX W.

CANVASS OF BIDS FOR REMOVING THE BRICK BUILDING NUMBERED 981–987, INCLUSIVE, BOYLSTON STREET, BOSTON, MASS.
MARCH 5, 1918.

BIDDER.	Amount.	Time of Completion.
New York Building Wrecking Co., 43 Tremont street, Boston, Mass.	$1,150.00	35 working days.
American Building Wrecking Co., 75 First street, E. Cambridge, Mass.	815.00	24 working days.
Commonwealth Bldg. Wrecking Co., 93 Old Colony avenue, South Boston, Mass.	800.00	34 working days.
Swift-McNutt Co., 70 Devonshire street, Boston, Mass.	775.00	31 working days.
Sterman Bros., Carter & Vale Sts., Chelsea, Mass.	390.00	Apr. 2, 1918.
New England Contracting Co., Maple & Third Sts., Chelsea, Mass.	325.00	36 working days.
City Building Wrecking Co., 122 Cambridge street, Charlestown, Mass.	151.00	40 working days.

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UE AI

NC., ASS.	
t.	
Barring out, rer 10,000 sq. yd:	00
Barring out, rer on a gravel with granite b	00
Furnishing and sand bed 1 paving blocks	00
Furnishing and inches thick.	00
Excavating for edgestone....	00
Furnishing all 3,900 sq. yds.	00
Furnishing all olithic sidewa	00
Furnishing, pre ballast 550 cu	50
Removing 4,00(tracks.....	00
Furnishing all porary paving	00
Totals.....	50
Barring out, rer joints 10,000 s	00
Total, omit	50

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NDIX

ARE, Bo

			Vinc[illegible], 5[illegible]ng, Bo[illegible]		Central Construction Co., 228 Southampton St., Roxbury, Mass.	
			Ju[illegible]		May 31, 1918.	
			Unit Price.	t.	Unit Price.	Amount.
Ba[illegible]						
	0		$1.50	.00	$1.15	$5,750.00
Ba[illegible]						
	0		1.15	.00	0.85	1,700.00
Fu[illegible]						
	0		0.40	.00	0.36	1,800 00
Fu[illegible]						
	0		1.60	.00	1.30	5,720.00
Ex[illegible]						
	0		0.30	.00	0.35	490.00
Fu[illegible]						
	0		0.75	.00	0.40	560.00
Fu[illegible]						
	0		15.00	.00	8.10	2,025.00
Re[illegible]						
	0		0.50	.00	0.25	500.00
Fu[illegible]						
	0		1.00	.00	0.60	120.00
	0		.....	4.00	.....	$18,665.00
Ba[illegible]						
	0		$2.25	0.00	$1.95	$9,750.00
	0		.....	4.00	.....	$22,665.00

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APPENDIX Z.

CANVASS OF BIDS FOR FURNISHING HARD PINE LUMBER.
TO BE DELIVERED AT PUBLIC ALLEY 444, REAR OF 354 NEWBURY STREET.
17 PIECES 12" x 12" in 12' LENGTHS.
31 PIECES 10" x 16" IN 24' LENGTHS.
16 PIECES 8" x 16" IN 24' LENGTHS.
100 8" x 8" TIES, EACH 10' LONG.
APRIL 29, 1918.

BIDDER.	Lump Price.	Time of Delivery.
Blacker & Shepard Co., 409 Albany Street, Boston, Mass.	$1,990.17	Immediate delivery.
William Curtis' Sons Co., 30 Eustis Street, Roxbury, Mass.	1,900.00	Delivery within 3 or 4 days.
C. F. Washburn, 82–114 Malden Street, Boston, Mass.	1,809.15	
P. S. Huckins Co., 40 Central Street, Boston, Mass.	1,803.70	Immediate delivery.
Andrew F. Leatherbee, 390 Albany Street, Boston, Mass.	1,802.18	Immediate delivery.
George McQuesten Co., 27 Kilby Street, Boston, Mass.	1,800.00	Within 3 days.

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